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# THE PHILIPPINE JOURNAL OF SCIENCE

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C. BOTANY

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## NOTES ON THE FLORA OF BORNEO

By E. D. MERRILL<sup>1</sup>

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

The flora of the great Island of Borneo is very imperfectly known, and for this reason it has been quite impossible to work out in detail the phytogeographic relationships between the Philippines and Borneo. From the geographic proximity of the islands, definite phytogeographic relationships are to be expected, yet so far as publications go, and so far as collections already made have been studied, the cases of special distribution of species between the Philippines and Borneo are strikingly weak when compared with those between the Philippines and the islands to the south and southeast of the Archipelago.

With the object of determining more in detail just what the relationships of the Philippine and Bornean floras are, an attempt has been made, in the past five or six years, to secure Bornean botanical material for purposes of study and comparison with that originating in the Philippines. Through the kindness of Mr. J. C. Moulton, director of the Sarawak Museum, Kuching, Sarawak, a native collector was secured, who worked intermittently for the Bureau of Science for several years under Mr. Moulton's direction, the specimens thus collected being transmitted to the Bureau of Science from time to time. Additional collections were made in Sarawak by Dr. F. W. Foxworthy in 1908 for the Bureau of Science. Important collections were also received in exchange, notably a nearly complete set of Charles Hose's Sarawak collections from the British Museum,

<sup>1</sup> Associate professor of botany, University of the Philippines.

description of *Dinochloa andamanica* thus: "Specimina ex insulis Philippinis, valvula interiore ciliata gaudentia et a cl. Munro cum *D. Tjangkorreh* conjuncta mihi est species nova et etsi eam non vidi *D. ciliatam* nomino;" Camus adds a figure of it. The Bornean specimens, while not quite identical with Philippine material, differ less from the type specimens of *D. ciliata* Kurz and *D. scandens* var. *angustifolia* Merr., than does other Philippine material placed here. The last two are unquestionably identical. The only other species of the genus known from Borneo is typical *Dinochloa scandens* O. Kuntze, represented by *Hose* 65.

#### PANICUM Linnaeus

**PANICUM BARBINODE** Trin. in Mém. Acad. Pétersb. VI 3' (1835) 256.

SANDAKAN, Drs. F. & C. Baker, January, 1915.

This species, apparently purposely introduced for forage purposes, has not previously been reported from Borneo. It is very frequently confused with *Panicum molle* Sw. Commonly known as Pará grass.

**PANICUM PERAKENSE** (Hook f.) comb. nov.

*Panicum humidorum* Ham. var. *perakense* Hook f. Fl. Brit. Ind. 7 (1897) 54; Ridl. Mat. Fl. Malay. Penins. (Monocot.) 3 (1907) 137.

In describing this form originally Hooker states "Probably a different species," i. e., distinct from *P. humidorum* Ham. This I am convinced is the case, and accordingly I have raised the variety *perakense* to specific rank. I have specimens from Perak, Ridley 14386; from Johor, Ridley 11007; and the Bornean specimen cited below.

SARAWAK, Mount Sudan, Native collector 2048 (Bur. Sci.). The species is new to Borneo.

**PANICUM MALABARICUM** (Linn.) Merr. in Philip. Journ. Sci. 4 (1910) Bot. 248.

*Poa malabarica* Linn. Sp. Pl. (1753) 69.

*Panicum arnottianum* Nees in Steud. Syn. Pl. Gram. (1854) 59.

BORNEO, Tambusan, Ridley 12328; Mount Sudan, Native collector 2047 (Bur. Sci.), the latter with prominently ciliate sheaths.

This species has been sunk in *Panicum nodosum* Kunth by some authors, but I consider it specifically distinct. For discussion see Merrill in Philip. Journ. Sci. 4 (1910) Bot. 248.

#### SPHAEROCARYUM Nees

**SPHAEROCARYUM PULCHELLUM** (Roth) comb. nov.

*Isachne pulchella* Roth Nov. Sp. (1821) 58.

*Panicum pulchellum* Spreng. Syst. 1 (1825) 322.

*Panicum malaccense* Trin. Gram. Pan. (1826) 204.

*Sphaerocaryum elegans* Nees ex Steud. Nomencl. ed. 2, 2 (1841) 620.

BORNEO, Kuching, Ridley 11341.

The species is new to Borneo. India and Ceylon to the Malay Peninsula, Singapore, and southern China.

## CYPERACEAE

## FIMBRISTYLIS Vahl

## FIMBRISTYLIS DURA (Zoll. &amp; Mor.) comb. nov.

*Isolepis dura* Zoll. & Mor. Syst. Verzeich. (1845-46) 97; Miq. Fl. Ind. Bat. 3 (1857) 312.

*Fimbristylis asperima* Boeckl. in Linnaea 37 (1871-73) 40; Clarke in Hook. f. Fl. Brit. Ind. 7 (1893) 643.

SARAWAK, Lundu, *Foxworthy* 325, May 31, 1908; near Kuching, *Native collector* 670 (Bur. Sci.), August, 1911.

The species has been reported from Borneo by Ridley, by Winkler, and by Miss Gibbs, as *Fimbristylis asperima* Boeckl. *Isolepis dura* is, however, the older name. Ceylon to the Malay Peninsula and Archipelago.

## MAPANIA Aublet

MAPANIA FOXWORTHYI sp. nov. § *Haloatema*.

Foliis coriaceis, usque ad 120 cm longis et 2 cm latis, basi haud angustatis, apice longissime sensim attenuatis, margine aculeato-scabris; capitulis longe pedunculatis, globosis, sub anthesin circiter 4 cm diametro, spicis circiter 25, distinctis, oblongo-ovoideis, 1.7 ad 2 cm longis, bracteis 1 ad 1.5 cm longis.

A coarse perennial glabrous plant. Leaves numerous, linear, coriaceous, somewhat shining, up to 120 cm long, 1.5 to 2 cm wide, base scarcely narrowed, sheathing but not widened or inflated, the upper portion gradually narrowed into a slender, aculeate-scabrid tail 15 to 20 cm in length, the margins rather prominently aculeate-scabrid, the midrib aculeate-scabrid on the lower surface in the upper part of the leaf. Scapes about 40 cm long, obscurely 3-angled. Heads, in flower, globose, about 4 cm in diameter, composed of about 20 distinct spikes, the individual spikes brown when dry, oblong-ovoid, 1.7 to 2 cm long, each composed of very many spikelets. Bracts ovate, brown, coriaceous, 1 to 1.5 cm long, those subtending the spikes 2 or 3, boat-shaped, keeled, about 8 mm long. Bracteoles about 12 mm long, 3 mm wide, oblong, coriaceous, striate, glabrous, obtuse. Two outer glumes linear, boat-shaped, scabrid on the keel, 10 mm long, the others linear, thin, about as long as the outer. Styles bifid, rarely trifid.

WAK, Mount Poë (Rumput), *Foxworthy* 392, June 3, 1908, near the of the mountain.

Species well characterized by its long narrow leaves which are very gradually narrowed upward to the long, slender, aculeate-scabrid tip but not narrowed toward the base; its long scapes; and its large globose solitary heads in which the individual spikes, about 25 in number, are distinct. It probably is as closely allied to *Mapania palustris* Benth. as to any other species, but is entirely distinct from that form.

MAPANIA PLATYPHYLLA sp. nov. § *Pandanophyllum*.

Foliis petiolatis, petiolo 15 ad 20 cm longo, laminis usque ad 40 cm longis et 8 cm latis, apice longe abrupte caudatis; scapis 10 ad 12 cm longis, monocephalis, capitulis anguste oblongis, 1.5 ad 2 cm longis.

Rhizome stout, the upper part covered with the much-broadened, somewhat inflated basal portions of the petioles. Leaf-blades oblong, chartaceous, up to 40 cm long and 8 cm wide, 3-nerved, gradually narrowed below into the rather stout petiole, which is 10 to 14 mm wide when spread, the basal portion rather abruptly enlarged, somewhat inflated, sheathing, when spread 4 to 5 cm in width, the apex rather abruptly narrowed into the slender, scabrid, 10 cm long, caudate appendage. Scapes 10 to 12 cm long, solitary or several in an axil, subtended by several overlapping bracts. Heads solitary, of a single oblong spike 1.5 to 2 cm in length. Bracts coriaceous, glabrous, about 8 mm long, the bracteoles similar but smaller. Outer two glumes somewhat ciliate on the keels.

SARAWAK, *Native collector 993* (Bur. Sci.), 1912.

Manifestly allied to the Bornean *Mapania petiolata* C. B. Clarke, but with leaf-blades twice as wide and half as long as in that species and shorter scapes.

## EUPHORBIACEAE

### ANTIDESMA Burmann

Few species of this rather large genus have been credited to Borneo, yet it is evident from the material at hand that the genus is largely developed in the island. Species previously credited to Borneo are *Antidesma auritum* Tul., *A. ghesaembilla* Gaertn., *A. gibbsiae* Hutchins., *A. montanum* Bl., *A. moritzii* Muell.-Arg., *A. neurocarpum* Miq., *A. stipulare* Bl., *A. tomentosum* Bl., and *A. venenosum* J. J. Sm., of which two are endemic. In our Bornean material three additional forms are represented by material insufficient for description, neither of which can I refer to any described species. *Antidesma cuspidatum* Muell.-Arg. is here credited to Borneo for the first time, while nine species are proposed as new, making the total number of species known from Borneo at least twenty-two.

ANTIDESMA CUSPIDATUM Muell.-Arg. in *Linnaea* 34 (1865) 67; DC. Prodr. 15<sup>a</sup> (1866) 252.

SARAWAK, *Native collector 266, 504, 507, 508* (Bur. Sci.); *Hewitt s. n.* Localities given on the labels are Santubong, Tabuan, Matang, and Rock Road.

The specimens are all with staminate flowers, but agree closely with the description of the above species and with a full series of specimens from Singapore, eight sheets, mostly collected by Ridley, and mostly erroneously named *Antidesma moritzii* Muell.-Arg. The Sarawak specimens have somewhat larger leaves than the Singapore ones, up to 20 cm long and 9 cm wide, but in all essentials seem to be identical with the

Singapore plant. The species is very readily distinguishable by its relatively long petioles, on the Bornean specimens the petioles varying from 1 to 2 cm. in length. The species is new to Borneo.

**ANTIDESMA VENENOSUM** J. J. Sm. in Ic. Bogor. 4 (1910) 41, t. 313.

This endemic species is represented by *Hose 317*, from Long Tarkun, Baram, November, 1894; by *Native collector 2814* (Bur. Sci.) from Selungo, Upper Baram, November, 1914; and by *Winkler 2513*, from Hayoep, south-eastern Borneo.

**ANTIDESMA FOXWORTHYII** sp. nov.

Frutex 1 ad 2 m altus, partibus junioribus inflorescentisque plus minusve rubiginoso-pubescentibus; foliis coriaceis in siccitate brunneis vel olivaceis, oblongis ad anguste oblongo-obovatis, usque ad 20 cm longis, basi acutis vel obtusis, apice prominente acuminatis, nervis utrinque circiter 7, adscendentibus, prominentibus; racemis ♀ axillaribus, solitariis, usque ad 12 cm longis; floribus 5-meris, breviter pedicellatis; fructibus 1 cm longis, valde inaequilateralibus, brunneis, leviter rugosis, carinatis, plus minusve inflatis, stylis terminalibus.

A shrub 1 to 2 m high, the young branchlets, leaves on the costa and nerves beneath, and the inflorescence more or less rubiginous-pubescent, the fully mature leaves becoming glabrous or nearly so. Branches slender, terete, pale-gray. Leaves oblong to narrowly oblong-obovate, coriaceous, brown or olivaceous when dry, somewhat shining, 12 to 20 cm long, 4 to 7 cm wide, narrowed below to the acute or obtuse base, the apex rather prominently acuminate, the acumen 1 to 1.5 cm long, blunt or somewhat apiculate; lateral nerves about 8 on each side of the midrib, prominent, ascending; petioles stout, pubescent, 2 to 3 mm long; stipules oblong-ovate to lanceolate, brown, obtuse to acuminate, 10 to 12 mm long, sometimes in unequal pairs. Pistillate racemes axillary, solitary, 10 to 12 mm long, the rachis rubiginous-pubescent. Fruits about 1 cm long, their pedicels stout, 1 mm long, the subtending bracteoles narrowly ovate, acuminate, pubescent, as long as the pedicels. Persistent calyx 3 mm in diameter, slightly pubescent, the lobes 5, triangular, acute, extending less than one-third to the base of the calyx. Fruits dark-brown when dry, glabrous, strongly inequilateral, one side nearly straight, the other strongly curved, somewhat inflated, keeled, somewhat rugose when dry, base rounded, apex apiculate, about 1 cm long; stigma small, terminal.

SARAWAK, Mount Poë, *Foxworthy 268* (type), 246, May 25 and 26, 1903, the former from thickets at the edge of clearings, the latter from an altitude of 1,000 meters.

This species strongly resembles and is manifestly closely allied to *Antidesma cumingii* Muell.-Arg. of the Philippines, but is readily distinguished by a number of characters, notably by its much fewer-nerved leaves. From the glabrous fruit it is assumed that the ovary is also glabrous, while in *Antidesma cumingii* the ovary is densely pubescent.

**ANTIDESMA GRANDISTIPULUM** sp. nov.

Frutex vel arbor parva, glabra, vel ramulis junioribus leviter puberulis; foliis lanceolatis vel anguste oblongo-lanceolatis, usque ad 35 cm longis, longe acuminatis, basi acutis, nitidis, nervis utrinque 15 ad 17, prominentibus, anastomosantibus; stipulis sessilibus, inaequilateralibus, usque ad 4 cm longis, acutis vel acuminatis, persistentibus, junioribus chartaceis, vetustioribus subcoriaceis, nitidis; inflorescentiis ♀ racemosis, axillaribus, solitariis, usque ad 35 cm longis, glabris, floribus 5-meris, pedicellatis; fructibus 1.3 ad 1.5 cm longis, compressis, leviter inaequilateralibus, in siccitate brunneis, nitidis, reticulatis, stylis terminalibus.

A glabrous shrub or small tree, or the young branchlets slightly puberulent. Branches and branchlets terete, pale, slender. Leaves lanceolate to narrowly oblong-lanceolate, 20 to 35 cm long, 4 to 6.5 cm wide, firmly chartaceous to subcoriaceous, brown and shining when dry, apex rather long and slenderly acuminate, base acute; lateral nerves 15 to 17 on each side of the midrib, prominent, anastomosing into a distinct, arched, submarginal nerve, the reticulations distinct; petioles stout, 5 to 10 mm long; stipules large, prominent, persistent, chartaceous to subcoriaceous, brown, shining, in texture and color similar to the leaves, somewhat inequilateral, narrowed toward the base and to the acute to acuminate apex, the larger ones up to 4 cm long and 2 cm wide, those on the younger branchlets smaller, sometimes only 1.5 cm long and about 1 cm wide. Pistillate racemes axillary, solitary, in fruit up to 35 cm in length, glabrous, the fruiting pedicels 2 to 3 mm long, the persistent calyx with five short teeth. Fruits oblong-ovate, somewhat inequilateral, brown, glabrous, and shining when dry, reticulate, compressed, 1.3 to 1.5 cm long, the stigma terminal.

SARAWAK, *Native collector 1148* (Bur. Sci.) (type), and a specimen, without number, from the Sarawak Museum, marked Kuching, November, 1905.

A very characteristic species, readily distinguishable by its long, narrow, slenderly acuminate leaves; its large persistent stipules; its very long, simple, pistillate racemes; and its large fruits. It is apparently closely allied to *Antidesma pachystachys* Hook. f. of the Malay Peninsula.



**ANTIDESMA SARAWAKENSE** sp. nov.

Species praecedente affinis, differt nervis lateralibus magis numerosis, 20 ad 22 utrinque, stipulis late ovatis vel subrhomboidis, obtusis, basi truncatis ad subcordatis, 1.5 ad 3 cm longis, racemis ♀ brevioribus, circiter 20 cm longis, pedicellis paullo longioribus.

A glabrous shrub or small tree, the branches slender, terete. Leaves oblong-lanceolate, 20 to 28 cm long, 4 to 7 cm wide, brown and shining when dry, paler beneath, apex rather prominently acuminate, apiculate, base acute; lateral nerves 20 to 22 on each side of the midrib, prominent, anastomosing and forming an arched intramarginal vein, the reticulations distinct; petioles about 1 cm long; stipules coriaceous, brown, shining, persistent, broadly ovate to subrhomboid, obtuse to rounded, base truncate to subcordate, 1.5 to 3 cm long, 1.2 to 2.5 cm wide. Fruiting racemes axillary, solitary, about 20 cm long. Fruits similar to those of *Antidesma grandistipulum*, their pedicels 5 to 7 mm long.

SARAWAK, Rock Road, Native collector 503 (Bur. Sci.), July 27.

Manifestly very closely allied to the preceding, but with more numerous nerved leaves, quite differently shaped stipules, shorter pistillate racemes, and longer pedicels. A full series of specimens may present intergrading forms, and thus ultimately lead to the reduction of the present species. Judging from the material available, however, it is sufficiently distinct.

**ANTIDESMA HALLIERI** sp. nov.

Frutex vel arbor subtus foliis ad costa nervisque ramulis junioribus stipulisque plus minusve rubiginoso-pubescentibus; foliis chartaceis, oblongis ad oblongo-lanceolatis, usque ad 18 cm longis, prominente caudato-acuminatis, basi acutis, nervis utrinque circiter 9; stipulis lanceolatis ad ovato-lanceolatis, tenuiter acuminatis, 1 ad 2 cm longis; racemis ♀ axillaribus, solitariis, usque ad 12 cm longis, floribus 5-meris, paucis, pedicellis sub fructu circiter 1 cm longis; fructibus subobovoides, haud compress, rotundatis, stigmatate sublateralibus.

A shrub or tree, the young branchlets, petioles, stipules, and lower surface of the leaves on the midrib and lateral nerves more or less rubiginous-pubescent, some parts densely so. Branches slender, terete, glabrous, pale-grayish when dry. Leaves chartaceous, oblong to oblong-lanceolate, 12 to 18 cm long, 3.5 to 4.5 cm wide, base acute, apex slenderly caudate-acuminate, the acumen usually about 2 cm long, the upper surface olivaceous, glabrous, the lower brown and prominently rubiginous-pubescent along the midrib and lateral nerves; nerves about 9 on each

side of the midrib, prominent, anastomosing; petioles 2 to 4 mm long; stipules lanceolate to ovate-lanceolate, slenderly acuminate, slightly inaequilateral, 1 to 2 cm long, 3 to 7 mm wide, more or less rubiginous-pubescent. Racemes axillary, solitary, the pistillate ones up to 12 cm long, somewhat pubescent, the flowers rather few, scattered, the pedicels in fruit about 1 cm long, spreading. Calyx pubescent, 5-parted, the lobes extending about one-half to the base. Fruit glabrous, not compressed, subobovoid, about 5 mm long, the stigma sublateral.

BORNEO, without definite locality, *Hallier 1773*.

A species well characterized by its rubiginous indumentum, but more especially by its scattered, long-pedicelled, obovoid, smooth fruits which are scarcely compressed, but sometimes roughly triangular in cross-section, and their sublateral stigmas. It is not closely allied to any species known to me.

**ANTIDESMA PACHYPHYLLUM** sp. nov.

Arbor, ramulis junioribus inflorescentiis ferrugineo-pubescentibus exceptis glabra; foliis crasse coriaceis, oblongis, usque ad 17 cm longis, prominente acuminatis, basi subacutis ad rotundatis, nitidis, in siccitate supra olivaceis, subtus brunneis, nervis utrinque circiter 8, distinctis; stipulis lanceolatis, circiter 4 mm longis, caducis; inflorescentiis ♀ brevibus, parce ramosis, ramis circiter 1 cm longis; floribus confertis, sessilibus, 4-meris, calycis ultra medium divis; fructibus breviter pedicellatis, leviter compressis, circiter 6 mm longis, stylis terminalibus.

A tree, glabrous except the very young branchlets, stipules, and inflorescences, which are ferruginous-pubescent. Branches terete, pale-grayish. Leaves oblong, rather thickly coriaceous, dark-olivaceous on the upper surface, brown on the lower, and prominently shining on both when dry, 8 to 17 cm long, 4 to 6.5 cm wide, apex prominently and usually acutely acuminate or the acumen apiculate, base subacute to rounded; lateral nerves about 8 on each side of the midrib, slender, distinct, anastomosing; petioles about 1 cm long; stipules lanceolate, acuminate, pubescent, about 4 mm long, caducous. Pistillate inflorescences axillary, solitary, in anthesis about 1 cm long, densely ferruginous-pubescent, the branches, from or near the base, usually 2 or 3, sometimes one or none, cylindric. Flowers sessile, densely arranged. Bracteoles pubescent, broadly ovate, rounded, less than 1 mm long. Calyx-segments 4, oblong-ovate, pubescent, 0.8 mm long, extending about two-thirds to the base of the calyx. Ovary ovoid, glabrous, about 1.5 mm long; stigma terminal. Fruit ovoid, slightly inequilateral, about 6 mm long, somewhat com-

pressed, red, wrinkled when dry, on somewhat thickened, glabrous, 1 mm long pedicels, the branches of the inflorescence in fruit 1 to 3 cm in length.

SARAWAK, Baram District, Miri River, *Hose 69* (type) with pistillate flowers, January, 1895; Baram, *Hose 139*, January, 1895, in fruit; Lundu, *Forworthy 32*, May 10, 1908, in fruit; without definite locality, *Native collector 1431, 1589* (Bur. Sci.), the latter with staminate flowers.

The last number cited, with staminate flowers, is referred here tentatively, and probably represents the same species. The inflorescences resemble those of the pistillate plants, but the branches are more slender and up to 3 cm in length. The flowers are sessile, 4-merous, and the calyx-segments extend more than half way to the base. The species is well characterized by its thickly coriaceous, strongly shining, prominently acuminate leaves; the few, short, cylindric, densely flowered branches of the pistillate inflorescence; and its sessile flowers; the fruits, however, on short, thickened, glabrous pedicels.

**ANTIDESMA PHANEROPHLEBIUM** sp. nov.

Arbor, ramulis inflorescentisque griseo-pubescentibus exceptis glabra vel subglabra; foliis oblongis, subcoriaceis, usque ad 23 cm longis, brunneis vel olivaceis, nitidis, abrupte subcaudato-acuminatis, basi acutis ad subrotundatis, nervis utrinque circiter 12, supra impressis, subtus valde prominentibus; inflorescentiis ♀ terminalibus vel subterminalibus, usque ad 15 cm longis, ramis 2 vel 3, valde elongatis; floribus breviter pedicellatis, calycis truncatis, 1.5 mm diametro, margin minute denticulatis, extus pubescentibus; fructibus ovoideo-ellipsoideis, glabris, 6 mm longis, utrinque angustatis, acutis, aequilateralibus, in siccitate rugosis, leviter carinatis, haud compressis.

A tree, the branchlets and inflorescence grayish or cinereous-pubescent with short hairs, the older branches terete, glabrous. Leaves oblong, subcoriaceous, 12 to 23 cm long, 5 to 10 cm wide, when very young somewhat pubescent on the midrib and lateral nerves on both surfaces, at full maturity quite glabrous or with a few hairs persisting along the midrib beneath, when dry somewhat shining, olivaceous or somewhat brownish, the apex abruptly subcaudate-acuminate, the acumen 1 to 1.5 cm long, acute or somewhat apiculate, the base acute to somewhat rounded; lateral nerves about 12 on each side of the midrib, impressed on the upper surface, very prominent on the lower surface, looped-anastomosing near the margins, the reticulations distinct; petioles 3 to 5 mm long, somewhat pubescent; stipules lanceolate, acute or acuminate, puberulent, about 5 mm long. Pistillate inflorescences terminal or subterminal, pubescent, up to 15 cm in length, each composed of two or three elongated branches, the flowers rather numerous, racemosely disposed.

Pedicels pubescent, stout, about 1 mm long, the bracteoles oblong-lanceolate, acuminate, pubescent, about 1.2 mm long. Calyx cup-shaped, pubescent, 1.5 mm in diameter, truncate, or with three or four very broad, very obscure lobes, or these not at all evident, the margins minutely denticulate. Ovary ovoid, glabrous, including the rather prominent, terminal stigmas about 2 mm long. Fruit ovoid-ellipsoid, 6 mm long, narrowed at both ends, acute, equilateral, glabrous, wrinkled, not compressed but obscurely keeled.

SARAWAK, without definite locality, *Native collector 1884* (Bur. Sci.) (type); Lundu, *Foxworthy 37*, May 10, 1908, known to the Dyaks as *camaiit*.

This species somewhat resembles specimens of *Antidesma moritzii* Muell.-Arg., but is not closely allied to it. It is well characterized by its truncate, minutely denticulate calyces, which are not at all or but very obscurely and shallowly 3- or 4-lobed; the few elongated branches of its terminal inflorescence; and its very prominently nerved leaves.

**ANTIDESMA RIVULARE** sp. nov.

Arbor 7 ad 8 m alta ramulis subtus foliis ad costa nervisque petiolis stipulis inflorescentiisque plus minusve villosis; foliis coriaceis vel subcoriaceis, in siccitate brunneis, nitidis, usque ad 20 cm longis, oblongis ad late oblongo-oblancoelatis, prominente acuminatis apiculatisque, basi leviter inaequilateralibus, plus minusve angustatis, rotundatis ad subacutis, nervis utrinque circiter 12, adscendentibus, supra impressis subtus valde prominentibus, stipulis lanceolatis, acuminatis, circiter 1 cm longis; racemis ♀ axillaribus, solitariis, usque ad 18 cm longis; floribus pedicellatis, 4-meris; fructibus anguste ovoideis, reticulatis, compressis, basi leviter inflatis, brunneis, nitidis, parce pubescentibus, circiter 8 mm longis, stylis terminalibus.

A tree 7 to 8 m high. Branches grayish, terete, glabrous, the branchlets rather densely villous with brownish-gray hairs. Leaves oblong to broadly oblong-oblancoelate, 11 to 20 cm long, 3 to 7 cm wide, brown and shining on both surfaces when dry, prominently and rather slenderly acuminate, the acumen apiculate, base somewhat narrowed, somewhat inequilateral, rounded or sometimes subacute, the upper surface glabrous, the lower pubescent on the midrib and lateral nerves; nerves about 12 on each side of the midrib, impressed on the upper surface, very prominent on the lower surface, ascending, anastomosing; petioles densely pubescent, 2 to 4 mm long; stipules narrowly lanceolate, acuminate, pubescent, about 1 cm long. Pistillate racemes solitary, axillary, in fruit up to 18 cm long; the rachis, pedicels, calyx, and bracteoles pubescent. Fruits rather scattered, reddish

when fresh, brown and shining when dry, reticulate, with few, short, scattered hairs, somewhat inequilateral, compressed, base somewhat inflated, rounded, about 8 mm long and 5.5 mm wide; stigmas terminal.

SARAWAK, Sungei Tingei, *Foxworthy 471*, June 25, 1908, at the edge of a tidal stream (type); Retuh, Sadong, *Native collector 2535* (Bur. Sci.), February-June, 1914, from debris attached apparently from the banks of streams subject to inundation in times of flood.

This species belongs in the group with *Antidesma tomentosum* Blume, and is well characterized by its narrow, somewhat inequilateral leaves, the nerves impressed on the upper surface, very prominent on the lower surface, rather strongly ascending, and its pubescent branchlets, petioles, inflorescences, stipules, midrib, and nerves on the lower surface of the leaves. The fruits are very sparingly pubescent and much smaller than in Blume's species.

**ANTIDESMA RUBIGINOSUM** sp. nov.

Frutex vel arbor parva, partibus junioribus stipulis subtus foliis ramulis inflorescentiisque dense rubiginoso-pubescentibus; foliis oblongis ad oblongo-lanceolatis, usque ad 15 cm longis, tenuiter acuminatis, basi acutis, nervis utrinque 6 vel 7, prominentibus, curvato-adscendentibus; stipulis lanceolatis, tenuiter acuminatis, circiter 1 cm longis; inflorescentiis ♀ racemosis, rari-ter depauperato-paniculatis, racemis pedunculatis, 2 ad 3 cm longis; floribus 4-meris, confertis, breviter pedicellatis, disco glabro, cupuliforme, truncato, prominente; ovario glabro, stylis terminalibus.

A shrub or small tree, prominently rubiginous-pubescent with rather soft, short hairs. Branches slender, terete, pale-gray, glabrous, the young branchlets densely rubiginous-pubescent as are the petioles, inflorescences, and the midrib and nerves on the lower surface of the leaves. Leaves oblong to oblong-lanceolate, firmly chartaceous to subcoriaceous, 9 to 15 cm long, 2.5 to 4 cm wide, narrowed below to the acute base and above to the slenderly acuminate apex, the acumen tipped by a long and slender apiculus, the upper surface dark-colored when dry, glabrous, the lower dark-brown, prominently rubiginous-pubescent on the midrib and nerves and with fewer hairs scattered over the surface; lateral nerves 6 or 7 on each side of the midrib, curved-ascending, prominent, anastomosing; petioles about 2 mm long; stipules narrowly lanceolate, slenderly acuminate, rubiginous-pubescent, often somewhat inequilateral or slightly falcate, about 1 cm long and 2 to 3 mm wide. Pistillate racemes spikelike, axillary, solitary, the upper ones sometimes with a single branch, densely rubiginous-pubescent, peduncled, 2 to 3 cm long, the upper part densely flowered. Pedicels stout, pubes-

cent, 1 to 1.5 mm long, about twice as long as the subtending bracteoles. Calyx pubescent, the lobes four, 0.5 mm long, extending about one-half to the base. Disk very prominent, cup-shaped, truncate, glabrous. Ovary ovoid, glabrous, the stigmas terminal.

SARAWAK, Baram District, Baram, *Hose 297*, October 10, 1894.

A species well characterized by its prominent, rubiginous indumentum; its short-petioled, slenderly acuminate leaves; its simple, axillary, spikelike, peduncled racemes; and the prominent, cup-shaped, truncate, glabrous disk of its pistillate flowers.

**ANTIDESMA STENOPHYLLUM** sp. nov.

Frutex vel arbor, glabra; foliis lanceolatis ad anguste lanceolatis, usque ad 17 cm longis et 3.5 cm latis, utrinque subaequaliter angustatis, basi acutis, apice longe acuminatis, coriaceis, nitidis, nervis utrinque circiter 10; stipulis anguste lanceolatis, acuminatis, circiter 7 mm longis; spicis ♂ axillaribus, solitariis, tenuibus, usque ad 5 cm longis; floribus 4- vel 5-meris, calycis laciniis brevibus, rotundatis.

An entirely glabrous shrub or small tree, the branches terete, grayish or brownish. Leaves narrowly lanceolate, coriaceous, olivaceous, shining, 11 to 17 cm long, 2 to 3.5 cm wide, subequally narrowed to the acute base and to the long and slenderly acuminate apex; lateral nerves about 10 on each side of the midrib, slender, curved-ascending; petioles stout, up to 5 mm in length; stipules lanceolate, coriaceous, acuminate, about 7 mm long. Male spikes slender, solitary, axillary, up to 5 cm in length. Flowers 4- and 5-merous, sessile, the bracteoles small, rounded. Calyx about 1.5 mm in diameter, shallowly 4- or 5-lobed, the lobes rounded, much shorter than the tube. Pistillate flowers and fruits unknown.

SARAWAK, Mount Sudan, *Native collector 2081* (Bur. Sci.) February-June, 1914.

A very characteristic species, distinguishable at once by its very long and narrow, slenderly acuminate, narrowly lanceolate, coriaceous leaves.

**ANTIDESMA TOMENTOSUM** Blume Bijdr. (1826) 1126; J. J. Sm. in Koord. & Valet. Bijdr. Boomsoort. Java 12 (1910) 264.

SARAWAK, Baram District, Entoyut River, *Hose 332*, December, 1894.

The specimen is with pistillate flowers, and agrees perfectly with Smith's extended description. The species has already been reported from Borneo by Smith, as well as from Java, the Batoe Islands, and Celebes; and, by the reduction of *Antidesma kingii* Hook f., to Perak.

**APOROSA** Blume

**APOROSA EUPHLEBIA** sp. nov.

Frutex vel arbor, inflorescentiis exceptis glaber; foliis anguste oblongis, usque ad 25 cm longis, utrinque nitidis, concoloribus,

integris, margine revolutis, subcoriaceis, breviter obtuse acuminatis retusisque, basi obtusis vel subacutis, nervis utrinque circiter 12, supra leviter impressis, subtus cum reticulis valde prominentibus; stipulis inaequimagnis, coriaceis, orbiculari-reniformibus, rotundatis, 1 ad 2 cm diametro; spicis ♂ e axillis defoliatis, ferrugineo-pubescentibus, usque ad 2.5 cm longis, sepalis 4, 0.5 mm longis, staminibus 2, rariter 3.

A shrub or tree, quite glabrous except the ferruginous-pubescent inflorescence. Branches terete, grayish, smooth. Leaves narrowly oblong, subcoriaceous, pale brownish olivaceous, of the same color on both surfaces and rather strongly shining when dry, apex abruptly and shortly broad-acuminate, the acumens retuse, base obtuse to subacute, margins entire, revolute; lateral nerves about 12 on each side of the midrib, somewhat impressed on the upper surface, very prominent on the lower surface, as are the lax primary reticulations, curved, arched-anastomosing; petioles thickened at the apex, 1.5 to 2 cm long; stipules orbicular or orbicular-reniform, equilateral, rounded, coarsely reticulate, in texture, color, etc., similar to the leaves, rounded, margins revolute, base cordate, clasping the branchlets, 1 to 2 cm in diameter, those of each pair unequal in size, one about one-half as large as the other. Male spikes in the axils of fallen leaves, fascicled, few in each fascicle, up to 2.5 cm in length. Flowers about 1 mm in diameter, the sepals 4, about 0.5 mm long, elliptic-obovate or elliptic, rounded, very slightly pubescent; stamens 2, rarely 3.

SARAWAK, Upper Baram, Selungo, Native collector 2823 (Bur. Sci.), November 26, 1914 (original number 75).

A species manifestly belonging in the same group as *Aporosa lunata* Kurz, but with entirely glabrous leaves and branchlets, and entirely different stipules, which are orbicular to orbicular-reniform, rounded, cordate, equilateral, not at all falcate, pointed, or semicordate as in Kurz's species.

**APOROSA HOSEI** sp. nov.

Frutex vel arbor partibus junioribus inflorescentiisque exceptis glabra; foliis oblongis, integris, coriaceis, acuminatis, basi rotundatis ad obtusis interdum obscure subcordatis, usque ad 20 cm longis, glabris, nervis utrinque 8 ad 10, curvato-adscendentibus, subtus prominentibus; stipulis lunatis, falcatis, acuminatis, circiter 1 cm longis; inflorescentiis ♂ fulvo-tomentosis, 2 ad 3 cm longis, floribus 5-meris, pedicellatis, ovario subglabro; floribus ♂ sessilibus, sepalis 3, obtusis, staminibus 2, longe exsertis.

A shrub or tree, glabrous except the very young tips of the branchlets and the inflorescences, which are fulvous-pubescent

or tomentose. Branches and branchlets terete, brownish to grayish. Leaves oblong, coriaceous, rather pale or pale-brownish-olivaceous when dry, entire, somewhat shining, quite glabrous on both surfaces or the very young ones slightly fulvous-pubescent on the midrib and nerves beneath, 10 to 20 cm long, 3 to 6.5 cm wide, the apex rather prominently acuminate, base obtuse to rounded, sometimes very obscurely cordate; lateral nerves 8 to 10 on each side of the midrib, not impressed on the upper surface, very prominent on the lower surface, curved-ascending, anastomosing, the primary reticulations fine, distinct, subparallel; petioles stout, about 5 mm long, when young fulvous-pubescent, soon becoming quite glabrous; stipules foliaceous, coriaceous, similar in texture and appearance to the leaves, lunate, strongly falcate, acuminate, about 1 cm long and 4 mm wide, when young very slightly pubescent, becoming glabrous. Male spikes short, cylindric, dense, 1 to 2 cm long, axillary and in the axils of fallen leaves, one or two to several in each axil, somewhat pubescent. Sepals 3, obovate to narrowly obovate, rounded, obtuse, slightly pubescent, about 1 mm long. Stamens 2, their filaments long-exserted, about 2.5 mm long. Female inflorescences racemose, 1 to 3 cm long, densely fulvous-tomentose, solitary or several from each axil, peduncled, or at least without flowers in the lower part, the pedicels stout, fulvous-pubescent, about 1 mm long. Calyx fulvous-tomentose, the sepals 5, oblong-ovate, acuminate, about 1 mm long. Ovary and styles black when dry, glabrous, or the ovary with very few, scattered, fulvous hairs, about 2 mm long, ellipsoid; styles 3, stout, spreading, nearly 3 mm long, cleft to about the middle into two stout arms.

SARAWAK, Baram District, Baram, *Hose 40, 92* (type), 278, March, 1895, and October, 1894; near Kuching, 5th mile, Rock Road, *Native collector 558* (Bur. Sci.), July 27, 1911.

A species manifestly closely allied to *Aporosa lunata* Kurz, from which it differs, however, in many characters, notably in its glabrous branches and leaves, and much fewer nerves which are not impressed on the upper surface. From *Aporosa benthamiana* Hook. f., to which it is apparently even more closely allied, it differs notably in its much smaller, fewer-nerved leaves.

**APOROSA SUBCAUDATA** sp. nov.

Frutex vel arbor subtus foliis ramulis inflorescentiisque dense ferrugineo-pubescentibus; foliis subcoriaceis, oblongis, integris, usque ad 20 cm longis, apice prominente subcaudato-acuminatis, basi acutis, nervis utrinque 9 ad 11, subtus valde prominentibus; spicis ♂ numerosis, 1 ad 2 cm longis, fasciculatis, axillaribus et e axillis defoliatis; sepalis 4, leviter pubescentibus; filamentis 2.



A shrub or tree, the young branches, the inflorescences, and the lower surface of the leaves rather densely ferruginous-pubescent. Older branches glabrous, reddish-brown, terete. Leaves subcoriaceous, oblong, 16 to 20 cm long, 5 to 6 cm wide, entire, base narrowed, acute, apex rather abruptly subcaudate-acuminate, the acumen slender, at least 1.5 cm long, the upper surface pale-greenish when dry, entirely glabrous, somewhat shining, the nerves very slightly impressed, the lower surface uniformly ferruginous- or brownish-pubescent, the indumentum dense on the midrib and lateral nerves, the hairs scattered on the reticulations; lateral nerves 9 to 11 on each side of the midrib, very prominent, curved-ascending, anastomosing, the primary reticulations prominent, subparallel; petioles 8 to 10 mm long, pubescent, ultimately glabrous; stipules deciduous, not seen. Pistillate spikes very numerous, 1 to 2 cm long, ferruginous-pubescent, densely many-flowered, 5 to 10 or more in each fascicle, the fascicles axillary and in the axils of fallen leaves. Sepals 4, somewhat pubescent, oblong, acute to obtuse, about 0.7 mm long. Stamens 2. Pistillate flowers unknown.

SARAWAK, Baram District, Baram, *Hose 204*, April, 1895.

A species well characterized by its indumentum, its numerous, crowded, fascicled staminate spikes, and its prominently subcaudate-acuminate leaves which are acute at the base, entirely glabrous on the upper surface and prominently pubescent beneath.

**APOROSA NIGRICANS** Hook. f. *Fl. Brit. Ind.* 5 (1887) 347.

SARAWAK, Matang Road, *Native collector 1155* (Bur. Sci.), May 15, 1911.

The species is new to Borneo. The specimen is with pistillate flowers, agrees well with Hooker's description, and matches Singapore specimens, *coll. Ridley*, fairly closely. The leaves are less acuminate than in the Singapore specimens, and are distinctly pubescent on the lower surface with scattered hairs, especially on the midrib and lateral nerves.

#### BREYNIA Forster

**BREYNIA RACEMOSA** (Blume) Muell.-Arg. in *DC. Prodr.* 15<sup>1</sup> (1866) 441; J. J. Sm. in *Koord. & Valet. Bijdr. Boomsoort. Java* 12 (1910) 177.

*Melanthesia racemosa* Blume *Bijdr.* (1825) 177.

*Phyllanthus reclinatus* Roxb. *Fl. Ind.* 3 (1832) 669.

*Breynia reclinata* Hook. f. *Fl. Brit. Ind.* 5 (1887) 331.

SARAWAK, near Kuching, *Native collector 559* (Bur. Sci.); Dutch Borneo, *Hallier 1345*.

The species has not previously been reported from Borneo. The Bornean and Malay Peninsula plant is unquestionably the same as the Javan species originally described by Blume and of which J. J. Smith has recently given a very complete and detailed description. In addition to the Bornean specimens, I have before me three specimens from Java, Singapore, *Ridley s. n.*, distributed as *Breynia coronata*, and Pahang,

*Burn Murdoch 206, Ridley 5043.* As Hooker f. has pointed out Mueller referred to *Breynia racemosa* representatives of at least three species, but the form described by Hooker under the name *Breynia reclinata* is unquestionably the same as Blume's original *Melanthesia racemosa*. The latter specific name, being the older, is here retained.

#### COELODEPAS Hasskarl

##### COELODEPAS HOSEI sp. nov.

Frutex vel arbor inflorescentiis exceptis glaber; foliis oblongis, firme chartaceis vel subcoriaceis, usque ad 20 cm longis, acuminate, basi acutis, obscure stipellari-biglandulosis, margine distanter denticulatis, nervis utrinque 7, prominentibus; inflorescentiis ♀ axillaribus, solitariis, racemosis, 2 ad 4 cm longis, leviter adpresse-pubescentibus, ovario pubescente, stylis brevibus, fimbriato-ramosissimis.

A shrub or tree, quite glabrous except the inflorescence. Branchlets pale-olivaceous, terete or somewhat compressed, lenticellate. Leaves oblong, firmly chartaceous to subcoriaceous, pale-olivaceous when dry, 12 to 20 cm long, 4 to 7 cm wide, apex rather abruptly and prominently acuminate, base acute, with a small stipellate gland on each side at the juncture with the petiole, margins in the upper one-half distantly denticulate, below entire; lateral nerves 7 on each side of the midrib, prominent, curved-ascending, anastomosing, the reticulations distinct, lax; petioles 1 to 3 cm long. Pistillate racemes axillary, solitary, 1 to 4 cm long, appressed-pubescent with short, pale hairs. Pedicels about 1 mm long, pubescent. Calyx-segments triangular, acute, about 0.5 mm long, pubescent. Ovary ovoid, pubescent, pale, 3-celled, cells 1-ovuled; styles about 2 mm long, spreading, divided into numerous slender fimbriae.

SARAWAK, Baram District, Entoyut River, *Hose 465*, November 13, 1894.

Apparently closely allied to *Coelodepas wallichiana* Benth., from which it is readily distinguished by its much smaller, longer-petioled leaves, which are acute at the base, denticulate above, and its racemose not spicate inflorescences.

#### CROTON Linnaeus

##### CROTON ENSIFOLIUS sp. nov. § *Eucroton*.

Frutex vel arbor parva, foliis junioribus inflorescentiisque exceptis glaber; foliis numerosis, linearis, usque ad 7 cm longis et 7 mm latis, coriaceis, junioribus parvisse stellato-lepidotis, margine distanter crenulatis; racemis 3 ad 6 cm longis, floribus inferioribus ♀, superioribus ♂; floribus ♀ sepalis 5, circiter 2 mm longis, ovario stellato-pubescentibus; ♂ petalis lineari-oblongis, margine dense albido-ciliatis; filamentis 10.

A shrub or small tree, nearly glabrous, the branches slender, terete, brownish, the younger ones somewhat striate. Leaves furfuraceous-lepidote, numerous, crowded, linear, 4 to 7 cm long, 4 to 7 mm wide, coriaceous, subequally narrowed to the cuneate base and rather blunt apex, the margins distantly crenulate, pale-greenish, rather dull when dry, entirely glabrous, the very young ones with few, scattered, pale, stellate scales, the basal glands rather prominent; lateral nerves about 6 on each side of the midrib, very obscure; petioles up to 3 mm in length. Racemes 3 to 6 cm long, sparingly stellate-furfuraceous or stellate-lepidote. Female flowers: Pedicels 1 to 1.5 mm long; sepals 5, oblong-ovate to ovate-lanceolate, acuminate, 2 to 2.5 mm long; petals none; ovary ovoid, pale stellate-pubescent, about 1.5 mm long, 3-celled; style arms spreading, 1.5 mm long. Male flowers above on the same inflorescence, more numerous than the female, about 4 mm in diameter, their pedicels 1.5 mm long. Sepals oblong-ovate, acute. Petals linear-oblong, flat, 1.6 mm long, margins prominently white-ciliate or lanate. Stamens 10; filaments about 2 mm long.

SARAWAK, Baram District, Lio-matu, Native collector 2770 (Bur. Sci.) (original number 21), October 30, 1914.

A very strongly marked species, readily recognized by its very narrow, linear, distantly crenulate, coriaceous leaves, which at maturity are entirely glabrous, but when young with few, scattered, stellate-lepidote scales. I know of no species to which it is closely allied. It probably belongs in the group with *Croton heterocarpus* Muell.-Arg.

#### GLOCHIDION Forster

##### GLOCHIDION PEDUNCULATUM sp. nov. § *Euglochidion*.

Arbor (vel frutex) floribus ♂ exceptis glabra; foliis ovatis ad oblongo-ovatis, firme chartaceis, nitidis, usque ad 8 cm longis, acuminatis, breviter acute apiculatis, aequilateralibus, nervis utrinque 6 vel 7, tenuibus; floribus 6-meris, perianthii segmentis interioribus quam exterioribus paullo minoribus, glabris, ♂ pedicellatis, antheris 5, coalitis; ♀ in capitulis breviter pedunculatis dispositis, pedicellatis, ovario dense vestito, 5-loculare, columnis stylaribus cylindraceis, dense pubescentibus, quam ovario multo longioribus.

A glabrous shrub or small tree, the branches and branchlets reddish-brown, slender, the latter slightly compressed or angled. Leaves distichous, ovate to oblong-ovate, 5 to 8 cm long, 2.5 to 3.8 cm wide, somewhat brownish-olivaceous when dry, smooth, shining, the lower surface paler than the upper, equilateral, the base acute to rounded, apex somewhat acuminate and minutely

and sharply apiculate; lateral nerves 6 or 7 on each side of the midrib, slender, distinct, curved-anastomosing; petioles about 4 mm long. Flowers axillary, all 6-merous, the upper ones mostly pistillate, the lower mostly staminate, sometimes both found in the same axil. Male flowers pedicellate, about 4.5 mm in diameter, the pedicels slender, 4 to 5 mm long. Outer three perianth segments ovate, recurved, about 3 mm long, the inner three similar, but considerably narrower, rather coriaceous. Anthers 5, united into a globose mass about 1 mm in diameter. Pistillate flowers numerous, crowded in definite peduncled heads, the peduncles 3 to 4 mm long, flowers 3 or 4 to 10 in a head, their pedicels 1 to 2 mm long, each head subtended by numerous, oblong, acuminate, 1 mm long bracts. Perianth segments 6, oblong-ovate, about 2.5 mm long, the inner three somewhat narrower than the outer ones. Ovary very densely pubescent, 5-celled, the column densely pubescent, stout, cylindric, not constricted at the base, slightly narrower than the ovary, densely pubescent, the stigmatic portions usually 5, glabrous, the column about four times as long as the ovary.

SARAWAK, *Native collector 150* (Bur. Sci.).

A very characteristic species, easily recognized by its peduncled heads of pistillate flowers, its 6-merous flowers, densely pubescent ovary and style, the latter cylindric, stout, about four times as long as the ovary. In aspect it somewhat resembles the Philippine *Glochidion trichogynum* Muell.-Arg., but is not closely allied to that species, and belongs in an entirely different section of the genus.

GLOCHIDION BREYNIOIDES C. B. Rob. in Philip. Journ. Sci. 4 (1909) Bot. 95.

SOUTH-EAST BORNEO, Hayoep, *Winkler 2565*, June 22, 1908.

Luzon, Mindoro, Palawan, Negros, and Leyte; new to Borneo.

GLOCHIDION LEIOSTYLUM Kurz Forest Fl. Brit. Burma 2 (1877) 345; Hook f. Fl., Brit. Ind. 5 (1887) 324.

SARAWAK, Baram District, *Hose 356*, 1894.

This species has been previously reported from Pegu to Tenasserim, the Malay Peninsula, and Singapore. The Bornean specimen cited above presents only male flowers, and agrees closely with Singapore specimens collected by Ridley.

GLOCHIDION KOLLMANNIANUM (Muell.-Arg.) J. J. Sm. in Koord. & Valet. Bijdr. Boomsort. Java. 12 (1910) 166.

*Phyllanthus kollmannianus* Muell.-Arg. in Flora 23 (1865) 378.

SARAWAK, *Native collector 179* (Bur. Sci.).

The specimen is identical in all respects with the Celebes plant collected at Baleh Anjen by Teysmann, mentioned by J. J. S. Smith, l. c. 168, as probably representing an abnormal form of *Glochidion kollmannianum*. The inflorescences on both are somewhat cymose, although some

fascicles occur. The specimens appear to be different from Javan material supposed to represent the same species, but the differences may be due mostly, if not entirely, to the abnormal inflorescences, probably caused by insects.

MACARANGA Thouars

MACARANGA INSIGNIS sp. nov. § *Caladiifoliae*.

Arbor parva, glabra, ramulis teretibus, crassis, laevis, pruinosis, cavis; foliis longe petiolatis, glabris, usque ad 40 cm longis, basi late peltatis, 7- vel 9-nerviis, late rotundatis vel truncatis, profunde palmatim 5-lobatis, lobis oblongis ad oblongo-lanceolatis, caudato-acuminatis, integris; inflorescentiis ♂ axillaribus, pedunculatis, subcapitatis, bracteis magnis pruinosis persistentibus suffultis, floribus dense confertis, staminibus 5 vel 6; floribus ♀ dense confertis, ovario cupreo- vel ferrugineo-furfuraceo; capsulis 5-locularis, extus laevis.

A small glabrous tree, the branchlets cylindric, smooth, pruinose, 6 to 10 mm in diameter, hollow, perforated, and inhabited by ants. Leaves coriaceous, glabrous, broadly ovate in outline, very deeply palmately 5-lobed, up to 40 cm in length, shining, peltate; base very broadly rounded or truncate, sometimes slightly undulate, sometimes with a very few minute teeth, the basal lobes spreading or slightly falcate, 8 to 11 cm long, much shorter than the three central lobes, the petiole inserted 6 to 7 cm from the margin; upper three lobes oblong to oblong-lanceolate, 5 to 10 cm wide, caudate-acuminate, entire or distantly and minutely denticulate, the sinuses extending to within 3 to 7 cm of the insertion of the petiole; nerves 7 or 9, palmate, very prominent; petioles pruinose, 25 to 40 cm long. Male inflorescences axillary, solitary, their pruinose peduncles up to 7 cm in length, the inflorescence dense, subcapitate, 2 to 3 cm in diameter, ovoid; bracts coriaceous, ovate to ovate-lanceolate, concave, curved, acuminate, 1.5 to 2.5 m long, pruinose, persistent. Male flowers very numerous, very densely crowded on the short branches, subtended, and more or less covered, by the bracts. Calyx externally slightly puberulent. Stamens 5 or 6; anthers 3- and 4-celled. Female inflorescence similar to the male, but the bracts apparently not persistent. Flowers crowded. Ovary cupreous- or ferrugineous-furfuraceous, smooth, ovoid, mostly 5-celled. Capsules depressed-globose, pedicelled, when dry about 1 cm in diameter, the valves longitudinally sulcate when dry, not appendaged, glabrous or somewhat furfuraceous.

SARAWAK, Native collector 169 (type), 171, 1156, 1509 (Bur. Sci.).

A remarkable species on account of its leaf characters, its dense inflorescences, and its symbiosis with ants. It is intermediate between the sections *Pachystemon* and *Caladiifoliae*, but on account of its anthers

I have placed it in the latter section, from which it differs in its deeply lobed leaves, more numerous stamens, and its cocci not appendaged. *Macaranga caladiifolia* Becc. is well represented by 167, 1432, and 1511 of the same collection.

**MOULTONIANTHUS** genus novum

(*Euphorbiceae-Cluytieae-Clutinae*)

Flores monoici, petaligeri, racemosi. Sepala ♂ 5, imbricata, libera. Petala 5, calyce multo longiora. Disci glandulae nullae. Stamina 8 vel 10, 2-verticillata, libera, antherae dithecae, introrsae, longitudinaliter dehiscens, filamenta brevissima. Ovarii rudimentum evolutum. Sepala ♀ 5, imbricata, libera. Petala 5, elongata. Disci glandulae nullae. Ovarium 3-loculare; styli liberi vel basi breviter connati, bifidi; stigmata papillata; ovula in loculis solitaria. Frutex vel arbor parva. Folia alterna, penninervia, breviter petiolata, obscure crenata; stipulis ovatis, profunde cordatis, persistentibus. Racemi axillares, elongati, flores ♂ numerosi, secus rachin fasciculati, ♀ pauci, solitarii, longissime pedicellati.

**MOULTONIANTHUS BORNEENSIS** sp. nov.

Frutex vel arbor parva inflorescentiis exceptis glabra; foliis oppositis, oblongis ad oblongo-ellipticis, coriaceis, usque ad 25 cm longis, apice late obtuse acuminatis, basi rotundatis, nervis utrinque circiter 10, prominentibus; stipulis 1 ad 4 cm longis, foliaceis; inflorescentiis ♂ racemosis vel depauperato paniculatis, usque ad 12 cm longis, multifloris, floribus tenuiter pedicellatis, fasciculatis; racemis ♀ elongatis, paucifloris, floribus longissime pedicellatis.

A shrub or small tree, glabrous except the inflorescence. Branches terete, slender, smooth, pale- to dark-brown when dry. Leaves opposite, oblong to oblong-elliptic, coriaceous, brown and shining when dry, 12 to 25 cm long, 5 to 9 cm wide, base equilateral, rounded, apex prominently but broadly blunt-acuminate, margins distantly crenulate or dentate-crenulate; lateral nerves about 10 on each side of the midrib, prominent, obscurely anastomosing near the margins, the reticulations obscure; petioles 5 mm long or less; stipules foliaceous, coriaceous, persistent, orbicular to ovate, 1 to 4 cm long, rounded to obtuse, base deeply cordate and clasping the stem. Racemes axillary, solitary, or sometimes one staminate and one pistillate in the same axil, sparingly pubescent. Male racemes many flowered, up to 12 cm long, sometimes developed into a depauperate panicle by short branches in the lower part. Flowers fascicled along the rachis, their pedicels up to 10 mm in length, slender, each fascicle subtended by several ovate, somewhat ciliate, 1 mm long bracteoles.

Sepals 5, ovate to orbicular-ovate, rounded, margins slightly ciliate, free; imbricate, about 2 mm long. Petals 5, free, imbricate, membranaceous, oblong-spatulate, about 5 mm long, 1.7 mm wide, rounded, base gradually narrowed, cuneate. Disk glands none. Stamens 8 or 10, in two verticels, entirely free, all inserted on the disk; anthers ovate, apiculate, introrse, longitudinally dehiscent, about 0.7 mm long, the filaments of the shorter anthers about 0.4 mm long, of the inner about twice as long. Rudimentary ovary present, consisting of three, free, slender, 3 mm long styles. Pistillate racemes slenderer than the staminate ones, up to 15 cm long, with very few, scattered, long-pedicelled flowers, usually not more than five flowers to a raceme, their pedicels up to 4.5 cm in length, somewhat thickened upward. Sepals 5, more or less pubescent, imbricate, free, the outer two reniform-ovate, rounded, about 2 mm long and 3 mm wide, the inner three ovate to oblong-ovate, obtuse, about 4 mm long. Petals 5, free, imbricate, oblong-obovate to oblong-spatulate, rounded, narrowed below to the cuneate base, glabrous, about 10 mm long, 4 to 4.5 mm wide. Disk glands and staminodes none. Ovary densely pubescent, composed of three cocci, 3-celled, cells 1-ovuled; styles stout, spreading or reflexed immediately after anthesis, pubescent, cleft half way to the base, free or very slightly united at the base, the stigmatic surface papillose. Fruits unknown, but apparently 3-celled, and composed of three dry cocci.

SARAWAK, near Kuching, *Native collector 412* (type), 464, 510, 563 (Bur. Sci.). One of the sheets is marked Matang Road, August 12, 1911, and another Rock Road, August 16, 1911.

A very characteristic genus and species, dedicated to J. C. Moulton Esq., director of the Sarawak Museum, through whose interest it was possible for me to secure rich collections of Bornean plants. The genus is probably best placed in the *Chutiseae-Chutiinae* near *Trigonostemon* and *Schizostigma*. The only other genus placed here that has its anthers in two verticels is *Trigonopleura*, but *Trigonopleura* and *Moultonianthus* are entirely dissimilar and not closely allied.

The plant is strongly characterized by its opposite, short-petioled, penninerved, eglandular leaves; its prominent, clasping, foliaceous, ovate, cordate, coriaceous, persistent stipules; and its dissimilar staminate and pistillate racemes; besides the peculiar floral characters given above in the diagnosis and description.

#### OMPHALEA Linnaeus

OMPHALEA MALAYANA sp. nov. § *Penninerviae*.

Frutex scandens, glaber, vel inflorescentiis parvis pubescentibus, ramis ramulisque teretibus, griseis vel brunneis; foliis anguste oblongis, oblongo-lanceolatis vel oblongo-oblanceolatis,

coriaceis, usque ad 40 cm longis, nitidis, apice breviter obtuse acuminatis, basi acutis ad obtusis, nervis utrinque circiter 15, prominentibus; inflorescentiis vel ramulis floriferis usque ad 40 cm longis, floribus paucis, pedicellatis, fasciculatis, ramulis floriferis sursum foliis juvenilibus instructis.

A scandent glabrous shrub or the younger parts of the inflorescence obscurely pubescent. Branches and branchlets terete, grayish or brownish, usually wrinkled when dry. Leaves coriaceous, shining, narrowly oblong to oblong-lanceolate or oblong-oblongeolate, 20 to 40 cm long, 4.5 to 7 cm wide, the apex blunt-acuminate, the acumen usually about 1 cm long, the base usually acute, rarely obtuse, and with a pair of prominent glands on the upper surface at the juncture of the petiole with the blade; lateral nerves about 15 on each side of the midrib, prominent, somewhat curved, anastomosing, the reticulations lax; petioles 1.5 to 4 cm long, stout. Inflorescences axillary, up to 40 cm in length, somewhat paniculate, the branches few, greatly elongated, and with rather numerous, thin, membranaceous, juvenile leaves toward their tips. Female flowers in scattered fascicles along the branches, their pedicels 6 to 10 mm long. Sepals 5, oblong, obtuse, glabrous, 2.5 to 3 mm long.

BORNEO, Sarawak, Baram, *Hose 44* (type), March, 1895; without definite locality, *Native collector 405* (Bur. Sci.). PHILIPPINES, Luzon, Province of Camarines, *For. Bur. 21116 Valderrama*, April 6, 1914: Province of Isabela, Palanan Bay, *Bur. Sci. 21130 Escritor*, June 25, 1913.

This species is closely allied to *Omphalea philippinensis* Merr., otherwise the only species of the genus known from the Indo-Malayan region, differing distinctly and consistently in its larger, fewer-nerved leaves. I can see no valid reason for considering the Philippine and Bornean specimens, cited above, other than the same species; the former were originally determined by me as *Omphalea philippinensis* Merr., to which species they manifestly cannot be referred.

#### OSTODES Blume

##### OSTODES FAUCIFLORUS sp. nov.

Frutex vel arbor, ramulis junioribus inflorescentiisque parce adpresse pubescentibus exceptis glaber; foliis firme chartaceis, oblongis, oblongo-ellipticis, vel oblongo-obovatis, usque ad 18 cm longis, brevissime petiolatis, acuminatis, basi acutis ad subrotundatis, vix stipellari-biglandulosis, margine distanter glanduloso-crenulatis, nervis utrinque 8 ad 13; inflorescentiis ♂ axillaribus, solitariis, brevissimis, racemosis, floribus paucis, longe pedicellatis; petalis obovatis, 5 ad 6 mm longis; staminibus circiter 12, filamentis latis, exterioribus liberis, 3 interioribus alte connatis.

A shrub or tree, glabrous except the sparingly appressed-



pubescent young branchlets and rachis of the short racemes. Branches slender, terete, gray or reddish-brown. Leaves alternate, firmly chartaceous, subolivaceous, shining, oblong, oblong-elliptic or oblong-obovate, 10 cm long, 4 to 7 cm wide, apex rather prominently acuminate, the acumen blunt, base acute to somewhat rounded, not or very obscurely glandular, the margins distantly glandular-crenulate; lateral nerves 8 to 13 on each side of the midrib, prominent, anastomosing, the reticulations lax, distinct; petioles 2 to 4 mm long; stipules ovate, obtuse, about 4 mm long. Staminate racemes axillary, solitary, very short, few-flowered, the rachis 1 cm long or less, usually but one flower maturing at a time, the bracteoles oblong, about 4 mm long, persistent, the upper inflorescences sometimes reduced to mere fascicles. Pedicels up to 2.5 cm long, thickened upward, slender. Sepals unequal, orbicular-obovate, margins ciliate, about 3 mm in diameter. Petals free, glabrous, obovate, rounded, 5 to 6 mm long. Stamens about 12, the exterior nine free, their filaments broad, flat, about 3 mm long, the interior three stamens with their filaments united for nearly their entire length. Rudimentary ovary none.

SARAWAK, Baram District, Baram, *Hose 244*, March, 1895.

Apparently not closely allied to any of the previously described species, well characterized by its short racemes, its short petioles, its long pedicels, and its broad flat filaments.

**OSTODES MACROPHYLLUS** (Muell.-Arg.) Benth. in Benth. & Hook. f. Gen. Pl. 3 (1880) 299; Pax in Engl. Pflanzenreich 47 (1911) 18.

*Tritaxis macrophylla* Muell.-Arg. in Flora 47 (1864) 482.

*Ostodes serrato-crenatus* Merr. in Philip. Journ. Sci. 4 (1910) Bot. 283.

SARAWAK, Samatan, *Foxworthy 141*, May 19, 1908, known to the Dyaks as *tuchung*.

I consider that Doctor Pax is quite correct in reducing my *Ostodes serrato-crenatus* to *O. macrophyllus*. The known range of the species is now Malacca, Pahang, Borneo, Sibuyan, and the Provinces of Laguna and Cagayan, Luzon.

#### DIMORPHOCALYX Thwaites

**DIMORPHOCALYX (?) BORNEENSIS** sp. nov.

Frutex vel arbor, partibus junioribus exceptis glaber; foliis oblongis ad oblongo-ovatis, usque ad 11 cm longis, acute acuminatis basi rotundatis, obscure stipellari-biglandulosis, margin distanter denticulatis, nervis utrinque circiter 12; inflorescentiis ♀ axillaribus, longissime pedunculatis, floribus paucis, pedicellatis, ad apicem depauperato-fasciculatis vel solitariis, pedunculis vetustioribus bracteis foliaceis suffultis; fructibus circiter 12 mm diametro, glabris, laevis, sepalis liberis, leviter accrescentibus.

A shrub or tree, glabrous except the slightly pubescent younger parts. Branches slender, terete, brownish or pale-greenish, glabrous, the young branchlets somewhat appressed ferruginous-pubescent as are the very young petioles. Leaves dark-olivaceous when dry, somewhat shining, glabrous, oblong to ovate-oblong, 7 to 11 cm long, 2.5 to 4.5 cm wide, rather prominently and sharply acuminate, base rounded and usually with two, minute, stipellate glands on the upper surface near the juncture with the petiole, margins distantly and minutely denticulate; lateral nerves slender, about 12 on each side of the midrib; petioles 1 to 3 cm long. Pistillate inflorescences axillary, 10 to 20 cm long, solitary, the flowers few, depauperately fasciated at the apex or solitary, the long peduncle without leaf-like bracts, or with several scattered along the upper one-third, or near the apex, the bracts leaf-like, lanceolate to oblong-elliptic, up to 1.6 mm long, persistent. Pedicels about 5 mm long, in fruit exceeding 1 cm in length. Sepals oblong, obtuse or slightly retuse, about 4 mm long and 1.5 mm wide, in mature fruit about 6 mm long and 2.2 mm wide, free or nearly so, persistent. Petals 5, glabrous, free, broadly spatulate, 5 mm long, 2 mm wide, much narrowed in the lower two-thirds. Disk-glands truncate, nearly square in outline, 0.5 mm long. Ovary ovoid, glabrous, about 1.5 mm long; style very short; divided into three parts, the arms bifid. Mature fruit depressed-globose, dark-colored, smooth and shining, about 12 mm in diameter, composed of three, dry, dehiscent cocci.

SARAWAK, Baram District, Entoyut River, *Hose 420*, November, 1894.

It is with some doubt that I have placed this species in *Dimorphocalyx*, as the staminate flowers are as yet unknown. In aspect it distinctly resembles *Dimorphocalyx longipes* Merr., but is not closely allied to that species. It is readily distinguishable by its few-flowered, very long-peduncled pistillate inflorescence, the flowers borne at the tip of the long peduncle, and the presence of leaf-like bracts scattered along the upper part of the peduncle on most of the inflorescences.

#### PHYLLANTHUS Linnaeus

PHYLLANTHUS RETICULATUS Poir. in Lam. Encycl. 5 (1804) 298.

SARAWAK, Retuh, Sadong, *Native collector 2544* (Bur. Sci.), February-June, 1914.

Not previously reported from Borneo. Tropical Africa and Asia through Malaya to the Philippines and tropical Australia.

#### PIMELEODENDRON Hasskarl

PIMELEODENDRON ACUMINATUM sp. nov.

Frutex vel arbor glabra; foliis longe petiolatis, oblongis, firme chartaceis vel subcoriaceis, usque ad 18 cm longis, integris, te-

nuitur acuminatis, basi acutis, eglandulosis, subtus distincte reticulatis, nervis utrinque 4 vel 5; racemis ♂ solitariis, circiter 2 cm longis, pedicellis quam floribus multo longioribus.

A glabrous shrub or tree, the branches slender, terete, reddish-brown. Leaves alternate, firmly chartaceous to subcoriaceous, brown when dry, oblong, entire, 9 to 18 cm long, 3.5 to 6 cm wide, base acute, eglandular, apex rather slenderly acuminate, the acumen 1 to 1.8 cm long, usually blunt; lateral nerves 4 or 5 on each side of the midrib, prominent, anastomosing, the primary reticulations rather lax, slender, distinct on the lower surface; petioles 1 to 6 cm in length, slender. Staminate racemes solitary, rather slender, about 2 cm long, axillary, springing from a small pulvinus; pedicels about 3 mm long, the staminate flowers about 2 mm in diameter, the calyx at least twice as short as the pedicel.

SARAWAK, Baram District, Baram, *Hose* 240, March, 1895.

Manifestly allied to *Pimeleodendron borneense* Warb., from which it is readily distinguishable by its long petioles; solitary, axillary, staminate racemes; and its thinner, fewer-nerved, rather slenderly acuminate leaves, the reticulations distinct on the lower surface. To *Pimeleodendron borneense* Warb. I refer *Hose* 206, 295, and *Native collector* 1048 (Bur. Sci.), all from Sarawak.

#### SCORTECHINIA Hooker f.

#### SCORTECHINIA ARBOREA (Elm.) comb. nov.

*Alchornea arborea* Elm. *Leaf.* Philip. Bot. 4 (1911) 1274.

*Alcinaeanthus arboreus* Pax & K. Hoffm. in *Engl. Pflanzenrich* 63 (1914) 415.

*Alcinaeanthus philippinensis* Merr. in *Philip. Journ. Sci.* 7 (1912) Bot. 1274.

The genus *Alcinaeanthus* proposed by me in the year 1912 must now be reduced to the older *Scortechinia* in spite of certain discrepancies between the original descriptions of the two genera. In proposing the genus *Scortechinia* Hooker f. placed it in the tribe *Phyllanthaceae* with doubt, being uncertain as to the number of ovules in each cell, giving the number doubtfully as two. Pax<sup>1</sup> considered its position doubtful, and placed it among the uncertain or imperfectly described genera at the end of the family. This was overlooked by me in working out the description and status of my genus *Alcinaeanthus*. While the female flowers are as yet unknown, I have been able definitely to determine from the examination of very young fruits that there is but a single ovule in each cell, and am confident that the genus was placed correctly by me in the *Platylobeae-Crotonoideae-Gelonieae*, and very close to the genus *Cheilosa* Blume.

It is to be noted, as already mentioned by Pax, that while in the original and, for that matter, subsequent descriptions of the genus *Scortechinia*, the stamens are described as free, in Hooker's<sup>1</sup> figure of the type

<sup>1</sup>Engl. & Prantl. *Nat. Pflanzenfam.* 3<sup>e</sup> (1890) 118.

species, *S. kingii*,\* the filaments are drawn, apparently by error, as united at the base. With this probable error corrected, and the number of ovules indicated as one in each instead of two, there remains no essential difference between *Scortechinia* and *Alcinaeanthus*; and, in fact, the Philippine species seems to be very closely allied to the Malayan ones. The type of the genus, *Scortechinia kingii* Hook. f. is described as having leaves without basal glands, at least the glands are not mentioned in the description nor shown in the figure. In a second species, *S. nicobarica* Hook. f., the basal glands are present.

In addition to the Philippine species mentioned above, the genus presents the following forms:

**SCORTECHINIA PARVIFOLIA** (Merr.) comb. nov.

*Alcinaeanthus parvifolius* Merr. in Philip. Journ. Sci. 9 (1914) Bot. 461.

Philippines.

**SCORTECHINIA KINGII** Hook. f. Ic. Pl. III 8 (1887) pl. 1706; Fl. Brit. Ind. 5 (1887) 366.

Perak, Malacca, Borneo.

**SCORTECHINIA NICOBARICA** Hook. f. Ic. Pl. III 8 (1887) sub pl. 1706, nomen; Fl. Brit. Ind. 5 (1887) 367.

**SCORTECHINIA FORBESII** Hook. f. Ic. Pl. III 8 (1887) sub pl. 1706, nomen.

This last species seems never to have been described.

New Guinea.

**SEBASTIANA** Sprengel

**SEBASTIANA CHAMAELEA** (Linn.) Muell.-Arg. in DC. Prodr. 15<sup>3</sup> (1866) 1175, var. **ASPEROCCA** (F.-Muell.) Pax & Hoffm. in Engl. Pflanzenreich 52 (1912) 117.

SARAWAK, Santubong, Native collector 2359 (Bur. Sci.), February-June, 1914.

The species is new to Borneo; India and Ceylon to Kwantung southward to northern Australia, with another variety in tropical Africa. *Cuming* 2324, reported from the Philippines by Pax and K. Hoffmann, was from Malacca, not from the Philippines; the species has not been found in the Philippines.

**TRIGONOPLEURA** Hooker f.

**TRIGONOPLEURA BORNEENSIS** sp. nov.

Arbor, ramulis petiolis subtus foliis ad costa nervisque floribusque pubescentibus; foliis oblongis, coriaceis, acuminatis, usque ad 15 cm longis, nervis utrinque circiter 11, prominentibus; floribus 3 fasciculatis, pedicellatis, sepalis extus dense griseo-puberulis; petalis oblongo-spatulatis, apice rotundatis, basi longe angustatis, 4.5 mm longis, ferrugineo-villosis, columna sursum incrassata.

A tree, the branchlets, petioles, and leaves beneath on the costa

\* Hook. f. Ic. Pl. III 8 (1887) pl. 1076, fig. 3.

and lateral nerves more or less ferruginous-pubescent. Branches terete, brown, eventually glabrous. Leaves coriaceous, glabrous, olivaceous and shining on the upper surface when dry, the lower surface brown, midrib and lateral nerves rather densely pubescent with short hairs, 10 to 15 cm long, 4 to 5.5 cm wide, apex rather abruptly acuminate, base rounded; lateral nerves about 11 on each side of the midrib, very prominent on the lower surface, anastomosing; petioles prominently rugulose when dry, pubescent, rather stout, 7 to 10 mm long. Staminate flowers in axillary fascicles, their pedicels 1.5 to 3 mm long. Sepals oblong-elliptic, rounded, 3 to 3.5 mm long, densely cinereous-puberulent externally. Petals oblong-spatulate, apex rounded, base long-narrowed, densely ferruginous-villous, about 4.5 mm long. Glands oblong, glabrous, 1 mm long. Staminal column 5 to 6 mm long, shortly stipitate, much narrowed below, densely ferruginous-villous; anthers 8, about 1 mm long, their short free filaments densely villous, 1 mm long or less. Arms of the rudimentary ovary slender, glabrous, about 1 mm long.

SARAWAK, Baram District, Miri River, *Hose 676*, April 25, 1895.

*Trigonopleura borneensis* is the third species for the genus, one being known from the Malay Peninsula, and one from Mindanao, Samar, and Leyte in the Philippines. The form above described is very distinct from the other two, well characterized by its leaves being pubescent beneath, with more numerous lateral nerves; its spatulate petals; and its staminal column distinctly thickened upward, not cylindric.

**TRIGONOPLEURA DUBIA** (Elm.) comb. nov.

*Alsodeia dubia* Elm. *Leaf. Philip. Bot.* 8 (1915) 2875 (March 27).

*Trigonopleura philippinensis* Merr. in *Philip. Journ. Sci.* 10 (1915) Bot. 275 (August 9).

MINDANAO, Province of Agusan, Cabadbaran, *Elmer 13956* (type number of *Alsodeia dubia* Elm.). SAMAR, *Bur. Sci.* 17457 *Ramos* (type of *Trigonopleura philippinensis* Merr.). LEYTE, *Wenzel 709,854,935*.

Opportunity is here taken to adjust the synonymy of the Philippine species, as it was nearly simultaneously described both by Mr. Elmer and by me; Mr. Elmer's specific name being the older, is here adopted.

The material on which *Alsodeia dubia* was based presents only staminate flowers, but it is *Trigonopleura*, not *Alsodeia*, and matches *Trigonopleura philippinensis* Merr. in all respects. While placed by Mr. Elmer in the *Violaceae*, it is evident from his statement regarding it that he was very uncertain as to its true position: "Rather uncertain as to the right family and may possibly belong to *Flacourtiaceae* or rather to *Leacinaeae*."

## LEGUMINOSAE

### BAUHINIA Linnaeus

This genus seems to be rather highly developed in number of species in Borneo. Those previously credited to the island are as follows: *Bauhinia acuminata* Linn., *B. brachyscypha* Baker, *B. burbidgei* Stapf (*B. creaghi*

Baker ex descr. is probably a synonym), *B. diptera* Blume, *B. elongata* Korth., *B. excelsa* Blume (*B. ferruginea* Korth., non Roxb.), *B. excurrens* Stapf, *B. finlaysoniana* Grah., *B. foraminifer* Gagnep., *B. kingii* Prain, *B. macropoda* Blume, *B. menispermacea* Gagnep., *B. semibifida* Roxb., and *B. stenostachya* Baker. More than one-half of these are known only from Borneo. The species proposed below are apparently distinct from the above-listed species, and from all other described Malayan forms. Several of the above species, notably *Bauhinia burbridgei* Stapf, *B. foraminifer* Gagnep., and *B. menispermacea* Gagnep., are represented in our recently collected material by fine series of specimens.

**BAUHINIA BORNEENSIS** sp. nov. § *Phanera*.

Frutex scandens, ramulis inflorescentiisque dense subferrugineo-pubescentibus; foliis late ellipticis, coriaceis usque ad 8 cm longis, basi cordatis, 11- ad 15-nerviis, subtus minute pubescentibus, apice usque ad  $\frac{1}{3}$  vel  $\frac{1}{2}$  divisus, lobis late rotundatis; racemis terminalibus, floribus longe pedicellatis, saltem 2.5 cm longis, petalis extus parvissime longe pilosis glabrescentibus.

A scandent shrub, the younger parts and the inflorescence densely pubescent with brown or ferruginous short hairs. Branches terete, brown, glabrous, lenticellate. Leaves coriaceous, broadly elliptic, 5 to 8 cm long, 4 to 8 cm wide, the upper surface dark-brown, glabrous, the lower minutely appressed ferruginous-pubescent, base cordate, 11- to 15-nerved, apex divided from one-fourth to one-third to the base, the sinus narrow, lobes equilateral, broadly rounded; petioles 2 to 3.5 cm long, ultimately glabrous. Racemes terminal, simple, densely pubescent, up to at least 20 cm in length, the pedicels densely pubescent, 3 to 4 cm long. Buds broadly clavate, the tube cylindric, somewhat gibbous at the base, 1 cm long, the limb oblong-cylindric, rounded or apiculate, just before anthesis about 2 cm long, striate. Sepals narrowly oblong, about 2.5 cm long, 6.5 mm wide, somewhat acuminate, coriaceous. Petals as long as the sepals, glabrous or with a very few, long, scattered hairs on the median portion of the back, the limb oblong to oblong-elliptic, rounded, up to 11 mm wide, base acute, claw 2 to 3 mm long. Fertile stamens 3; anthers oblong, 12 mm long. Ovary and stout style densely appressed ferruginous-pubescent.

SARAWAK, Native collector 1906 (type), 1040, 1787, 1874 (Bur. Sci.); possibly referable here is *Hose* 575 from Baram District, but in my specimen, which presents rather young buds, the petals are densely pubescent on the median part of the back.

A species in the group with *Bauhinia ferruginea* Roxb., from which it is distinguished by its petals being quite glabrous, or at most with very few, long, soft hairs on the median portions of the back, not densely tomentose.

**BAUHINIA CARDIOPHYLLA** sp. nov. § *Phanera*.

Frutex scandens, glaber; foliis late ovatis, usque ad 6 cm longis, integris, obtusis vel obtuse acuminatis, basi cordatis, 7-nerviis, subtus glaucescentibus; floribus racemosis, longe tenuiter pedicellatis, petalis oblongo-obovatis, circiter 11 mm longis. Species *B. menispermaceae* similis et affinis, differt foliis multo minoribus, floribusque minoribus.

A scandent cirrhiferous glabrous shrub, the branches and branchlets reddish-brown when dry, terete. Leaves subcoriaceous, broadly ovate, 3.5 to 6 cm long, 3 to 5 cm wide, base cordate, apex obtuse or obtusely acuminate, entire, the upper surface pale-brownish when dry, the lower glaucous; nerves 7, slender, none of them reaching the apex; petioles slender, 1 to 2 cm long. Racemes terminal, glabrous, rather few-flowered, the pedicels slender, elongated, up to 3.5 cm in length. Buds clove-shaped, the tube slender, 4 mm long, narrowed into the pedicel, the limb ovoid, subacute. Sepals reflexed, oblong-ovate, acute or slightly acuminate, about 4.5 mm long. Petals somewhat ferruginous-pilose on the back, unequal; two oblong-obovate, rounded or retuse, about 11 mm long and 5.5 mm wide, base gradually narrowed, acute; three oblong-oblongeolate, as long as the other two but 2.5 to 3.5 mm wide and obtuse to somewhat acuminate. Fertile stamens 3; filaments glabrous, about 5 mm long; anthers short, wider than long. Sterile filaments nearly as long as the fertile ones. Ovary and style glabrous. Disk ferruginous-villous.

SARAWAK, *Native collector 1858* (type), 1857 (Bur. Sci.); Baram District, *Hose 289*, October 26, 1894.

Manifestly closely allied to *Bauhinia menispermacea* Gagnep., which it greatly resembles, differing however in its much smaller size throughout; much smaller, thinner leaves, which are obtuse or blunt acuminate; smaller, few-flowered racemes; and smaller flowers. *Bauhinia menispermacea* Gagnep. is represented by *Native collector 129*, 1282, 1954 (Bur. Sci.), Matang Road, March, 1912.

**BAUHINIA HAVILANDII** sp. nov. § *Phanera*.

Frutex ut videtur scandens parce pubescentibus; foliis oblongo-ovatis, acuminatis, integris, basi late rotundatis subcordatisque, 5- vel 7-nerviis, chartaceis, usque ad 10 cm longis; inflorescentiis terminalibus, racemosis vel depauperato-paniculatis, dense multifloris, bracteis bracteolisque linearibus; petalis oblongo-obovatis ad oblongo-spatulatis, circiter 7.5 mm longis, crispatis, obtusis, extus pallide pilosis; ovario dense hirsuto.

A shrub; apparently scandent, the branchlets, inflorescences,

and petioles sparingly ferruginous-pubescent, the branches and branchlets brown or dark-brown when dry. Leaves chartaceous, brown and shining when dry, oblong-ovate, entire, acuminate, 7 to 10 cm long, 3.5 to 5 cm wide, glabrous, base broadly truncate-rounded and often shallowly cordate, prominently 5- or 7-nerved; petioles pubescent, 1 to 2 cm long. Inflorescence terminal, a simple raceme or with one or two branches from the base, up to 7 cm in length, rather densely many-flowered, the rachis and pedicels appressed-pubescent with rather pale hairs, the bracts and bracteoles linear, pubescent. Pedicels slender, about 2 cm long. Buds somewhat clove-shaped, the tube slender, narrowed below to the pedicel, 2 to 3 mm long, the limb oblong-ovoid, narrowed at both ends, acute, pale-pubescent externally with grayish or cinereous, short hairs. Sepals lanceolate, acuminate, reflexed, about 6 mm long. Petals subequal, 7 to 8 mm long, oblong-obovate to oblong-spatulate, much crisped, obtuse, base narrowed, acute, rather densely pale appressed-pilose externally, the claw 1 to 2 mm long. Fertile stamens 3; filaments slender, glabrous, about 6 mm long; anthers broadly ellipsoid, 1.7 mm long. Ovary shortly stipitate, inequilateral, oblong, densely pale-hirsute, about 4 mm long, much shorter than the style, which is glabrous above, hirsute below.

SARAWAK, *Native collector 199* (Bur. Sci.).

Well characterized by its entire, acuminate, glabrous leaves; its densely flowered inflorescence; pointed buds, the tube short, gradually narrowed to the pedicel; and its densely hirsute ovaries. It does not seem to be closely allied to any other Bornean species.

**BAUHINIA HOSEI** sp. nov. § *Phanera*.

Frutex scandens partibus junioribus inflorescentiisque dense cupreo-ferrugineo-pubescentibus; foliis oblongo-ovatis, coriaceis, in siccitate brunneis, usque ad 9 cm longis, basi 5-nerviis, cordatis, apice acuminatis retusisque; inflorescentiis racemosis, floribus longe pedicellatis; petalis extus parce ferrugineo-pubescentibus, obovatis, usque ad 16 mm longis, rotundatis; antheris circiter 2 mm diametro; ovario deorsum dense piloso, sursum glabro.

A scandent shrub, the younger parts and inflorescence densely pubescent with short, mostly appressed, shining, cupreous-ferruginous hairs. Branches brown, smooth, glabrous, terete. Leaves thickly coriaceous, oblong-ovate, 7 to 9 cm long, 4 to 5.5 cm wide, base rounded, prominently cordate, 5-nerved, apex acuminate, the acumen slightly retuse, the upper surface quite glabrous, the lower surface similar in color, pubescent on the nerves, ultimately glabrous or nearly so; petioles densely pub-



escent, 1 cm long or less. Racemes terminal, solitary, sometimes with one or two short basal branches, all parts densely pubescent, the pedicels slender, up to 5 cm in length. Buds clove-shaped, densely pubescent, the tube cylindric, slender, 8 to 10 mm long, the limb ovoid. Sepals oblong-ovate, obscurely acuminate, about 8 mm long. Petals externally slightly appressed-ciliate, obovate, about 16 mm long, the limb broad, rounded, up to 14 mm wide, the claw stout, 2 to 4 mm long, base slightly narrowed, rounded. Fertile stamens three, stout, glabrous, about 10 mm long; anthers suborbicular, 2 mm in diameter; sterile filaments seven, 6 to 7 mm in length. Ovary oblong, appressed ferruginous-pubescent especially in the lower part and along the margins, glabrous above; style short, glabrous.

SARAWAK, Baram District, Marudi, *Hose 254*, June 12, 1895.

A species belonging in the group with *Bauhinia pyrrhaneura* Korth., but with shorter petioles, fewer nerves, and obscure reticulations. It also resembles *Bauhinia bidentata* Jack, but differs from that species in many characters.

**BAUHINIA MEGALANTHA** sp. nov. § *Phanera*.

Frutex scandens ramulis inflorescentiis floribusque dense adpresse ferrugineo-tomentosis; foliis chartaceis, late ellipticis, 9- vel 11-nerviis, usque ad 10 cm longis, basi late rotundatis, foliolis usque ad  $\frac{1}{2}$  connatis, apice rotundatis; inflorescentiis terminalibus, racemosis, paucifloris, floribus magnis, usque ad 8 cm longis, longe pedicellatis, sepalis petalisque extus dense ferrugineo-tomentosis.

A scandent shrub, the younger parts and the inflorescence densely ferruginous-pubescent with short, appressed hairs. Branches terete, brown, becoming quite glabrous. Leaves broadly elliptic, chartaceous, 7 to 10 cm long, 6 to 8 cm wide, the upper surface brownish-pruinose when dry, quite glabrous, the lower paler and appressed-pubescent with scattered, short, brownish hairs, base broadly rounded, sometimes very shallowly cordate, 9- or 11-nerved, apex cleft about one-fifth to the base, the lobes rounded, the sinus very narrow, the midrib excurrent as a slender, somewhat pubescent, 4 to 5 mm long mucro; petioles slender, 3 to 5 cm long. Racemes terminal, solitary, few-flowered, the axis 8 to 20 cm long, and with the pedicels, calyx, and petals densely appressed ferruginous-pubescent with short hairs, the pedicels about 5 cm in length. Buds widely clavate, the tube cylindric, slightly gibbous at the base, 1.5 to 2 cm long, rather abruptly enlarged at the base of the oblong, acute limb. Sepals 4.5 to 5 cm long, about 8 mm wide, coriaceous, acuminate, at least twice as long as the tube. Petals subequal, about 5

cm-long, 1.5 to 1.8 cm wide, narrowly oblong to narrowly oblong-ovate, rounded at the apex, base acute, densely pubescent outside, glabrous within, the claw stout, 4 to 5 mm long. Fertile stamens 3; filaments glabrous; anthers narrowly oblong, 2.2 cm long. Ovary rather long-stipitate, all parts, including the stipe and the stout style, densely ferruginous-pubescent.

SARAWAK, Baram District, Entoyut River, *Hose 163*, November 10, 1894.

A species well characterized by its large flowers, belonging in the group with *Bauhinia exelsa* Blume (*B. ferruginea* Korth., non Roxb.), from which it is easily distinguished by its slender, much longer petioles.

**BAUHINIA MOULTONII** sp. nov. § *Phanera*.

Frutex scandens, ramulis subtus foliis inflorescentiisque ferrugineo-pubescentibus; foliis coriaceis, suborbicularis, usque ad 9 cm diametro, prominente 7- vel 9-nerviis, basi cordatis, apice breviter lobatis, lobis rotundatis; floribus racemosis, racemis paucifloris; petalis oblongis ad anguste oblongis, circiter 12 mm longis, extus parce pilosis; staminibus fertilibus 3, antheris latis; ovario glabro.

A scandent shrub, the branchlets, petioles, lower surface of the leaves, and the inflorescence more or less ferruginous-pubescent, the branches and branchlets terete, brown in color, the former ultimately glabrous. Leaves suborbicular, rather thickly coriaceous, 5 to 9 cm long, base prominently cordate, divided one-fourth to the base or less, the sinus narrow, lobes broadly rounded, prominently 7- or 9-nerved, the primary reticulations lax, prominent, the secondary ones obsolete or nearly so, the upper surface brown when dry, glabrous, the lower somewhat paler, rather uniformly pubescent with scattered, short, brown hairs; petioles 2 to 5 cm long. Racemes ferruginous-pubescent, short, rather few-flowered, the lower pedicels longer than the upper ones, deciduous, slender, up to 2 cm in length. Buds clove-shaped, the tube slender, cylindric, 2 to 4 mm long, rather densely pubescent, the limb ovoid, slightly pubescent or nearly glabrous. Sepals oblong-ovate, acute or slightly acuminate, 5 to 6 mm long, in anthesis spreading or somewhat reflexed. Petals oblong to narrowly oblong, about 11 mm long, 4 to 5 mm wide, sparingly pilose on the back with long scattered hairs, the base acute, the claw 1 mm long or less. Disk ferruginous-villous. Ovary oblong, compressed, glabrous, about as long as the style. Fertile stamens 3, the anthers wider than long.

SARAWAK, *Native collector 201, 202* (type) (Bur. Sci.).

Apparently quite distinct from the other described Bornean and Malayan forms, characterized by its shortly lobed, pubescent, cordate, rather thickly

coriaceous leaves, the lobes rounded; its short racemes with clove-shaped buds, rather long pedicels, glabrous ovary; and anthers wider than long.

**ERYTHROPHLOEUM Afzelius**

**ERYTHROPHLOEUM DENSIFLORUM** (Elm.) Merr. in Philip. Journ. Sci. 4 (1910) Bot. 267.

*Cynometra densiflora* Elm. Leaf. Philip. Bot. 1 (1907) 222.

BRITISH NORTH BORNEO, Sebatik Island, *Villamul* 52, September 26, 1915, locally known as *miamot*.

Previously known only from the Philippines, where it is widely distributed. The specimen is sterile, but is unquestionably identical with the Philippine form. Doctor Foxworthy notes that the wood structures is also identical with the Philippine form.

**CRUDIA Schreber**

**CRUDIA TENUIPES** sp. nov.

Arbor glabra ramis ramulisque tenuibus; foliis plerumque 4-foliolatis, foliolis alternis, firme chartaceis, oblongo-ellipticis, prominente acuminatis, basi acutis ad rotundatis, usque ad 10 cm longis, nervis primariis utrinque circiter 7, tenuibus; racemis circiter 6 cm longis, floribus longissime tenuiterque pedicellatis, pedicellis 2 ad 3 cm longis, sepalis reflexis, oblongo-ovatis, 4 mm longis, ovario dense ferrugineo-piloso.

A glabrous tree, the branches and branchlets very slender, terete, brownish, smooth, the ultimate branches less than 1.5 mm in diameter. Leaves alternate, 15 to 18 cm long, the rachis 4 to 6 cm long, not produced beyond the last leaflet; leaflets usually 4, alternate, oblong-elliptic, firmly chartaceous, glabrous, 7 to 10 cm long, 3 to 5 cm wide, apex prominently acuminate, the acumen usually about 1 cm long, rather slender, blunt, base acute to rounded, upper surface brownish when dry, the lower faintly glaucous; primary lateral nerves about 7 on each side of the midrib, slender, anastomosing, scarcely more prominent than are the secondary ones and primary reticulations; petiolules about 3 mm long. Racemes on the ultimate branchlets solitary, opposed to the ultimate leaf, about 6 cm long, the rachis and peduncle slender, the pedicels of the flowers very slender, 2 to 3 cm long, each with a minute bracteole, or its scar, at about the lower third or fourth. Calyx-tube nearly 2 mm long, the lobes 4, reflexed, glabrous about 4 mm long, oblong-ovate, obtuse or rounded, reflexed, brown when dry. Ovary oblong-ovoid, about 3 mm long, densely ferruginous-pilose, narrowed upward, the style slender, about 7 mm long, pubescent below, glabrous above; ovules 2 or 3.

SARAWAK, *Native collector 1385* (Bur. Sci.).

A species very readily distinguished from all described forms by its very slender, much-elongated pedicels, which vary in length from 2 to 3 cm. It is not closely allied to the only other known Bornean species, *Crudia havilandii* Prain. A third species is represented by *Native collector 688* (Bur. Sci.), but the material available is hardly sufficient to warrant describing it at this time.

#### PELTOPHORUM Walpers

##### PELTOPHORUM RACEMOSUM sp. nov.

Arbor, ramulis petiolis inflorescentiisque ferrugineo-pubescentibus; foliis circiter 25 cm longis, circiter 5-jugatis; foliolis oblongo-ellipticis, coriaceis late rotundatis apiculatisque, basi subacutis, aequilateralibus vel leviter inaequilateralibus, circiter 10-jugatis, usque ad 3 cm longis; inflorescentiis axillaribus, solitariis, racemosis, quam foliis brevioribus, floribus circiter 2.5 cm diametro.

A tree, the younger branchlets, petioles, and inflorescences prominently ferruginous-pubescent. Leaves about 25 cm long, bipinnate, the pinnae usually 5 pairs, 8 to 12 cm long, their rachises ferruginous-pubescent. Leaflets oblong-elliptic, coriaceous, equilateral or nearly so, 2 to 3 cm long, 8 to 12 mm wide, apex broadly rounded, minutely apiculate, base subacute, margins usually revolute, the upper surface dark-brown and shining when dry, the lower paler, uniformly and rather densely pubescent with short subferruginous hairs. Inflorescence racemose, the racemes axillary, solitary, about 14 cm long, ferruginous-pubescent. Pedicels slender, about 1 cm long. Calyx densely ferruginous-pubescent, the tube very short, nearly flat, 4 to 5 mm in diameter, the lobes oblong, rounded, about 1 cm long. Petals obovate, much wrinkled, rounded, pubescent on the back, about 1.5 cm long. Stamens about 1 cm long, the filaments much thickened and densely villous at the base, glabrous above; anthers versatile, oblong, 4 mm in length. Ovary and style pubescent.

SOUTHEASTERN BORNEO, Hayoep, *Winkler 2424*.

Distinguished from all the oriental species of the genus by its racemose inflorescence, few pinnae, comparatively few, relatively rather large, and nearly equilateral leaflets.

PELTOPHORUM INNERME (Roxb.) Naves in Blanco Fl. Filip. ed. 3, pl. 335, ex F.-Vill. Novis. App. (1880) 69 in syn. (*P. ferrugineum* Benth.).

SARAWAK, near Kuching, *Sarawak Museum 11*; near Mount Santubong, *Native collector 2373* (Bur. Sci.); Miri River, *Hose 562, 685*, January, April, 1895.

Malay Peninsula and Indo-China to the Philippines, Malaya, and north-eastern Australia.

INTSIA Thouars

INTSIA BAKERI Prain in Sci. Mem. Med. Off. Army Ind. 12 (1901) 13.

SARAWAK, Baram, *Foxworthy 482*, there known as *miraboo*.  
Siam, Malacca, and the Andaman Islands; new to Borneo.

INTSIA RETUSA (Kurz) O. Ktze. Rev. Gen. Pl. 1 (1891) 192.

SARAWAK, Baram District, *Hose 507*; British North Borneo, near Sandakan, *Villamil 52*, sterile.

Delta of the Ganges, the Andaman Islands, Malay Peninsula, and Cochinchina; new to Borneo.

MEZONEURUM Desfontaines

MEZONEURUM PLATYCARPUM sp. nov. § *Eumezoneurum*.

Frutex scandens, aculeatus, partibus junioribus subtus foliis inflorescentiisque plus minusve brunneo-puberulis vel pubescentibus; foliolis alternis, subcoriaceis, usque ad 4.5 cm longis, oblongo-ellipticis ad obovatis, apice late rotundatis vel subtruncatis, basi inaequilateralibus; floribus circiter 15 mm longis, extus dense cinereo- vel griseo-puberulis, calycis tubo valde obliquis, gibbosis; petalis valde inaequalibus; fructibus inaequaliter oblongo-obovoideis, circiter 12 cm longis et 5.5 cm latis, glabris, nitidis, seminibus circiter 5.

A scandent aculeate shrub, the younger parts, lower surface of the leaflets, and the inflorescence brownish- or griseous-puberulent. Leaves apparently large, bipinnate, the rachis with retrorse spines. Leaflets numerous, alternate, subcoriaceous, oblong-elliptic to obovate, 2 to 4.5 cm long, 1.2 to 3 cm wide, apex broadly rounded or subtruncate, the midrib forming sometimes a very short apiculus, base usually distinctly inequilateral, rounded or slightly cordate, the lamina on one side extending farther along the petiolule than on the other, the upper surface glabrous, shining, nearly black when dry, the lower puberulent; lateral nerves 7 to 9 pairs, rather slender, anastomosing, scarcely more distinct than are the secondary ones and the primary reticulations; petiolules about 2 mm long. Flowers numerous, somewhat crowded on the racemelike branches of the inflorescence, their pedicels pubescent, about 10 mm long, the flowers about 15 mm long. Calyx-tube very oblique, gibbous, 4 to 5 mm long, externally densely puberulent, about 7 mm in diameter, the lobes very unequal, the larger one broadly obovate, rounded, puberulent, concave, about 7 mm long and 6 mm wide, two lateral ones about 5 mm long and 3.5 mm wide, elliptic-ovate, rounded, the remaining two suborbicular, 4 to 5 mm in diameter. Petals very unequal, one about 10 mm long and 8 mm wide, glabrous, prominently two-lobed, when spread about 8 mm wide, the lobes some-

what falcate, rounded, divaricate, the sinus with a short stipitate process, base much narrowed into the stout, 6 mm long claw, the other four petals subequal, oblong, acuminate, about 4 mm long. Filaments stout, 10 to 12 mm long, below clothed with long hairs. Ovary narrowly oblong, pubescent, somewhat compressed, including the pubescent style about 13 mm in length. Pod brown and shining when dry, about 12 cm long and 5.5 cm wide, inequilaterally oblong-obovate, slightly curved along the winged side, broadly curved along the other, slightly reticulate, with a short pubescent apiculus, the wing about 1 cm wide; seeds about 5.

SARAWAK, Baram District, Miri River, *Hose 70*, January, 1895.

The first representative of the genus reported from Borneo, well characterized by its broad pods and very unequal petals.

#### PAHUDIA Miquel

##### PAHUDIA ACUMINATA sp. nov.

Arbor, inflorescentibus exceptis glabra; foliis circiter 20 cm longis, 3-jugis, foliolis firme chartaceis, oblongis ad oblongo-ovatis, nitidis, usque ad 10 cm longis, tenuiter acute acuminatis, basi acutis ad rotundatis, subtus pallidis, nervis primariis utrinque circiter 10, tenuibus; inflorescentibus cinereo-pubescentibus, paucifloris, depauperato-paniculatis, circiter 6 cm longis; petalis 1 vel interdum 2, superioribus flabelliformis, circiter 12 mm longis, longe unguiculatis, inferioribus lineari-spatulatis; staminibus fertilibus 7, usque ad 6 cm longis; ovario circiter 2 mm longo, stylis brevissimis.

A tree, glabrous except the inflorescence. Leaves pinnate, about 20 cm long, the leaflets 6, opposite, firmly chartaceous, shining and brownish-olivaceous on the upper surface, the lower surface pale, oblong to oblong-ovate, 7 to 10 cm long, 4 to 7 cm wide, base acute, apex long and slenderly acuminate, the acumen up to 1.5 cm in length, acute; lateral nerves about 10 on each side of the midrib, slender, anastomosing, scarcely more distinct than are the secondary nerves and primary reticulations; petioles 2 to 3 mm long. Inflorescence a depauperate, few-flowered panicle, or reduced to a few fascicled racemes, excluding the flowers about 6 cm in length, all parts rather densely cinereous-pubescent with short hairs. Bracts in general broadly ovate, subpersistent, rounded or obtuse, about 6 mm long, often wider than long, densely pubescent. Calyx-tube about 5 mm long; outer two sepals narrowly elliptic, about 8 mm long and 4 mm wide, rounded, the inner two broadly elliptic, about 9 mm long and 6 to 7 mm wide, all pubescent. Upper petal about 12

mm long, puberulent, the limb flabellate, 7 to 8 mm wide, broadly rounded, base much narrowed, the claw about 6 mm long, pubescent below; inferior petal, when present, linear-spatulate, up to 7 mm in length. Stamens 9, the upper two sterile, very slender, 2 to 3 mm long, the lower seven much elongated, somewhat ciliate near the base, about 6 cm long. Ovary shortly stipitate, oblong, compressed, including the strongly incurved or involute style about 2 mm long, pubescent along one side, the stipe short, pubescent.

SARAWAK, Baram District, Baram, *Hose 98*, March, 1895.

The first representative of the genus known from Borneo, in appearance resembling *Pahudia javanica* Miq. and *P. rhomboidea* Prain. It differs from both in its fewer leaflets which are prominently and slenderly acute-acuminate, not blunt-acuminate or retuse, but especially from the above two forms and the other known representatives of the genus in its very short style, which is at most 1 mm in length.

#### FLEMINGIA Roxburgh

FLEMINGIA MACROPHYLLA (Willd.) O. Ktze. ex Prain in Journ. As. Soc. Beng. 66<sup>2</sup> (1897) 440, in nota; cf. Merrill in Philip. Journ. Sci. 5 (1910) Bot. 130 (*F. congesta* Roxb.).

SARAWAK, Lundu, *Foxworthy 404*, June, 1908; Baram District, *Hose 215*, November 30, 1894.

New to Borneo; India to southern China, the Philippines, and Malaya.

#### ALBIZZIA Durazzini

ALBIZZIA SCANDENS Merr. in Philip. Journ. Sci. 4 (1909) Bot. 265.

SARAWAK, Baram District, *Hose 528, 691*, January and April, 1895.

Previously known only from Palawan. The Sarawak specimens very closely match the type.

#### DALBERGIA Linnaeus f.

DALBERGIA SUBALTERNIFOLIA (Elm.) Merr. in Philip. Journ. Sci. 10 (1915) Bot. 15.

SARAWAK, without definite locality, *Native collector 1891* (Bur. Sci.).

This specimen certainly represents the same species as our Palawan material. It is characterized by its trifoliolate leaves, belongs in the section *Amerimnon*, *Endespermum*, and is allied to *Dalbergia densa* Benth.

DALBERGIA SIMPLICIFOLIA sp. nov. § *Amerimnon*, *Endespermum*.

Species praecedente similis et valde affinis, differt foliis omnibus 1-foliolatis inflorescentiis multo brevioribus.

Apparently scandent, glabrous except the young branchlets and the inflorescence. Branches terete, rugose when dry, lenticellate, brown in color. Leaves all simple, elliptic to oblong-elliptic, 7 to 13 cm long, 3.5 to 7 cm wide, castaneous and shining when dry, base rounded, apex rather prominently blunt-acuminate, the lower surface slightly pubescent along the midrib when

young, becoming quite glabrous; lateral nerves about 7 on each side of the midrib, slender, not prominent; petiole, including the petiolule, 1 to 1.5 cm long. Inflorescence axillary, cymose, ferruginous-pubescent, 2 to 3 cm long. Flowers about 6 mm long, their pedicels 1 to 2 mm in length, sparingly pubescent. Calyx somewhat cup-shaped, 3.5 mm long, sparingly appressed-pubescent, shortly 5-toothed, three of the teeth narrower than the other two. Petals sparingly pubescent externally. Standard with an orbicular, rounded limb about 3 mm in diameter, reflexed in anthesis, the claw slender. Keel petals as long as the standard, prominently hastate or appendaged at the base, the claw slender, 2.5 mm long, the limb inequilateral, oblong-obovate, somewhat falcate, rounded. Stamens united into two phalanges of four each, with an intermediate one between the phalanges, the vexillary filament wanting. Ovary narrowly oblong, stipitate, densely and minutely ferruginous-pubescent, the style subulate, about 2 mm long.

SARAWAK, Baram District, Miri, *Hose 678*, April, 1895.

A species well characterized by its unifoliate leaves; the single leaflet comparatively large, castaneous and shining when dry, and of nearly the same color on both surfaces; and its short inflorescences. It is manifestly very closely allied to *Dalbergia subalternifolia* (Elm.) Merr. of Palawan and Sarawak, which, however, has much longer inflorescences and 3-foliate leaves.

PTEROLOBIUM R. Brown

PTEROLOBIUM BORNEENSE sp. nov.

Frutex scandens, aculeatus, inflorescentiis foliisque exceptis glaber; foliis circiter 20 cm longis, rhachibus griseo-puberulis, pinnis circiter 10-jugatis, 4 ad 6 cm longis; foliolis 10- ad 14-jugatis, glabris, anguste oblongis, circiter 1 cm longis, 3 ad 4 mm latis, apice rotundatis, leviter retusis, basi inaequilateralibus; inflorescentiis dense pubescentibus, circiter 20 cm longis, floribus numerosis; leguminis glabris, 5 cm longis, circiter 1.4 cm latis, basi turgidis, obscure reticulatis, apice late rotundatis, lateraliter apiculatis.

A scandent shrub, the branches terete, smooth, dark-colored, glabrous, somewhat pruinose when dry, armed with short reflexed spines at the nodes. Leaves about 20 cm long, the rachis with short retrorse spines at the nodes, griseous-puberulent as are also the rachises of the pinnae; pinnae about 10 pairs, 4 to 6 cm long; leaflets 10 to 14 pairs, narrowly oblong, glabrous, dark-brown when dry, about 1 cm long, 3 to 4 mm wide, apex rounded, usually retuse and sometimes with a minute apiculus, base inequilateral, rounded, the lamina extending farther along the petiolule



on one side than on the other, nerves ad reticulations obsolete. Panicles terminal, about 20 cm long, the branches rather few, densely brownish-pubescent with short hairs, densely many-flowered. Flowers not seen. Pedicels in fruit pubescent, 3 to 4 mm long; persistent calyx sparingly rusty-pubescent, inequilateral, 3 to 4 mm in diameter. Pods glabrous, about 5 cm long, 1.4 cm wide, the basal seed-bearing portion somewhat turgid, nearly black when dry, very obscurely reticulate, subrhomboid-ovate in outline, about 1.5 cm long and 1.2 cm wide, the wing brown, shining, the upper side slightly curved, the style subsistent as a long slender apiculus up to 1.5 cm long, falling and leaving a very short apiculus, the wing broadly rounded at the apex, slightly narrowed above.

SARAWAK, Baram District, Lio-matu, Native collector 2761 (Bur. Sci.) (original number 12) October 29, 1914.

A species manifestly allied to *Pterolobium densiflorum* Prain of the Malay Peninsula and *P. microphyllum* Miq. of Java. From the former it is distinguished by its shorter pinnae; rather fewer leaflets, which are smaller in size; its shorter inflorescence; and its rather wider wing, which is distinctly curved along the upper margin and not narrowly rounded at the apex. From Miquel's species it is distinguished by its fewer pinnae and leaflets, larger leaflets, and pubescent pedicels.

#### SPATHOLOBUS Hasskarl

##### SPATHOLOBUS OBLONGIFOLIUS sp. nov.

Frutex scandens partibus junioribus inflorescentisque exceptis glaber; foliolis oblongis, usque ad 22 cm longis, acuminatis, basi acutis, nervis utrinque 9, prominentibus, adscendentibus, rhachibus haud productis; paniculis axillaribus, dense tomentosis, subpyramidatis, pedunculatis, circiter 20 cm longis, floribus circiter 8 mm longis, in ramulis ultimis racemose dispositis; fructibus junioribus dense adpresse tomentosis.

Scandent, glabrous or nearly so except the younger parts and the densely tomentose inflorescences. Branches terete, lenticellate. Petioles glabrous, 5.5 to 7 cm long, not produced beyond the lateral leaflets, the stipels linear, about 3 mm long; leaflets oblong, subequally narrowed to the acute base and the rather prominently acuminate apex, pale or brownish and shining when dry, 18 to 20 cm long, 5 to 6.5 cm wide, coriaceous, the terminal one equilateral, the others more or less inequilateral, their petioles black when dry, 8 to 10 mm long; lateral nerves 9 on each side of the midrib, prominent, ascending. Panicles axillary, about 20 cm long, peduncled, subpyramidal, the rachis and branches rather densely tomentose with spreading ferruginous hairs, these in age becoming rather pale. Flowers racemously

disposed on the ultimate branchlets, about 8 mm long, their pedicels ferruginous-tomentose, about 2 mm long, the bracteoles minute, about 0.5 mm long. Calyx 4 mm long, pubescent, the lobes oblong, acute or acuminate, nearly 2 mm long, the upper two connate into a notched or retuse lobe. Standard 9 mm long, the limb orbicular, retuse, 5 to 6 mm in diameter, the claw slender. Wings and keel similar, oblong to oblong-obovate. Ovary pubescent, narrowly oblong. Young fruit membranaceous, narrowly oblong-obovate to oblong, inequilateral, apex slightly falcate-rounded and apiculate, rather densely appressed-pubescent with pale-ferruginous hairs, when very young about 3 cm long and 1 cm wide, apparently much larger at maturity.

SARAWAK, Baram District, Mount Skiwa, *Hose 441*, December, 1894, in fruit; Apoh River, *Hose 486* (type), in flower, November 20, 1894.

A species well characterized by its tomentose inflorescence, its oblong, subequally narrowed leaves, and by the rachis not being produced beyond the lateral leaflets. In the last character this species approaches *Spatholobus bracteolatus* Prain of Perak; however, it is otherwise quite different from Prain's species.

**SPATHOLOBUS AFFINIS** sp. nov.

Species praecedente affinis, differt rhichibus supra foliolis lateralibus distincte productis, petiolo usque ad 15 cm longo, foliolis majoribus, usque ad 9 cm latis, paniculis minus pubescentibus, calycis lobis superioribus integris, haud retusis.

Scandent, glabrous except the inflorescence. Leaves 3-foliate, the petioles about 15 cm long, the rachis produced 1.5 cm above the insertion of the lateral leaflets. Leaflets coriaceous, lateral ones more or less inequilateral, the terminal equilateral, subolivaceous and shining when dry, base acute, apex acuminate, up to 25 cm long and 9 cm wide, the lateral nerves ascending, prominent, 9 or 10 on each side of the midrib; petiolules stout, 10 to 12 mm long. Inflorescences tripinnately paniculate, axillary, branched from the base, pyramidal, appressed subferruginous-pubescent. Flowers about 9 mm long, very similar to those of the preceding species, but the upper lobe of the calyx quite entire.

SARAWAK, Baram District, Mount Trekan, *Hose 632*, July, 1895, altitude about 600 meters.

Manifestly closely allied to *Spatholobus oblongifolius* Merr., but distinguished by its produced leaf rachis, much longer petioles, broader leaflets, and entire, not retuse or notched upper calyx-lobe.

**SPATHOLOBUS GYROCARPUS** (Wall.) Benth. Pl. Jungh. (1852) 238.

SARAWAK, Baram District, Lio-matu, *Native collector 2775* (Bur. Sci), October 31, 1914.

Malay Peninsula and Luzon; new to Borneo. The specimen differs from

our Philippine material somewhat in leaf-shape, and in its duller indumentum, while the flowers are nearly sessile. Other than the three species considered above, and *S. ferrugineus* Benth., represented by *Native collector* 690 from near Kuching, there are at least three other distinct species represented in our Bornean collections, but the specimens are rather inadequate.

**DERRIS Loureiro**

**DERRIS ELEGANS** (Grah.) Benth. Pl. Jungh. (1852) 252.

SARAWAK, Baram District, *Hose* 861, January, 1895.

Tenasserim to the Andaman Islands, the Malay Peninsula, Sumatra, and the Philippines; new to Borneo.

**DERRIS DIADELPHA** (Blanco) Merr. in Philip. Journ. Sci. 5 (1910) Bot. 103 (*D. sinuata* Wall.).

SARAWAK, near Kuching, *Native collector* 692, 1405 (Bur. Sci.).

Ceylon and India to Indo-China, the Philippines, and Malay Peninsula and Archipelago; new to Borneo.

**FORDIA Hemsley**

**FORDIA ANGUSTIFOLIOLA** sp. nov.

Arbor glabra vel subglabra; foliis usque ad 40 cm longis, foliolis circiter 17, estipellatis, coriaceis, lanceolatis vel anguste lanceolatis, usque ad 14 cm longis et 3 cm latis, tenuiter acuminatis, basi acutis, subtus pallidis, nervis utrinque circiter 8; racemis e ramis vetustioribus, usque ad 25 cm longis, multifloris; floribus circiter 1 cm longis, brevissime pedicellatis.

A nearly glabrous tree. Leaves up to 40 cm long, glabrous or nearly so. Leaflets about 17, coriaceous, estipellate, lanceolate to narrowly lanceolate, 10 to 17 cm long, 2.5 to 3 cm wide, apex rather slenderly acuminate, base acute, the upper surface rather pale when dry, the lower much paler than the upper; lateral nerves about 8 on each side of the midrib, prominent, curved; petiolules 5 mm long or less. Racemes from the older branches, solitary or in pairs, up to 25 cm in length, many-flowered, sparingly pubescent. Pedicels about 1 mm long, somewhat pubescent. Calyx cup-shaped, somewhat inequilateral, subtruncate, about 3 mm long and wide, the teeth broad, obscure, externally slightly pubescent. Standard externally subferrugineous-puberulent, about 10 mm long, 6 mm wide, retuse, spreading or reflexed in anthesis, narrowed below into a short, broad claw. Wings narrowly oblong, rounded, as long as the standard, about 1.8 mm wide, the claw slender, about 3 mm long; keel up to 2.5 mm wide, the claw equalling that of the wings. Stamens glabrous, the vexillary one free at the base, united with the others above. Ovary linear, minutely appressed-pubescent, narrowed upward into the slender curved style. Pod flat, about 2 cm wide, the valves much twisted when dry.

SARAWAK, Matang Road, *Native collector 198* (Bur. Sci.), January 3, 1911.

Closely allied to *Fordia coriacea* Dunn, but distinguished by its much more numerous, narrower, glabrous leaflets which are acute at the base, and by its longer racemes. I have before me a specimen of *Hose 75* on which Dunn's species was in part based.

#### CLITOREA Linnaeus

CLITOREA CAJANIFOLIA (Presl) Benth. in Mart. Fl. Bras. 15: 121.

SARAWAK, Santubong, *Foxworthy 422*; Tabaan, *Native collector 703, 1038, 1905* (Bur. Sci.).

A native of Brazil, now introduced and naturalized in Siam, the Malay Peninsula, Singapore, and Java; new to Borneo.

#### CANAVALIA DeCandolle

CANAVALIA LINEATA (Thunb.) DC. Prodr. 2 (1825) 404.

SARAWAK, Buntal, *Native collector 1636* (Bur. Sci.); Baram District, *Hose 54, 605*, January and April, 1895.

A littoral species of wide tropical distribution, not, however, before definitely recorded from Borneo.

#### CAESALPINIA Linnaeus

CAESALPINIA CRISTA Linn. Sp. Pl. (1753) 880 (*C. bonduc* L., *C. bonducella* Flem.).

SARAWAK, Santubong, *Native collector 2218* (Bur. Sci.), along the seashore. Tropics of the world.

#### DESMODIUM Desvaux

DESMODIUM GYROIDES (Roxb.) DC. Prodr. 2 (1825) 326.

SARAWAK, *Native collector 1410, 2025* (Bur. Sci.); Baram District, Miri River, *Hose 515*, January, 1895.

New to Borneo. India to Formosa, southward to New Guinea.

DESMODIUM UMBELLATUM (Linn.) DC. Prodr. 2 (1825) 325.

SARAWAK, *Native collector 1045, 1620, 2210* (Bur. Sci.); Baram District, *Hose 264*, December, 1894.

New to Borneo; along tropical shores, Mascarene Islands and India to southern China, northern Australia, and Polynesia.

DESMODIUM TRIFOLIASTRUM Miq. Fl. Ind. Bat. 1<sup>a</sup> (1855) 248.

SARAWAK, foot of Mount Santubong, *Native collector 2319* (Bur. Sci.), February-June, 1914.

Perak, Java, Mindanao, and New Guinea, probably also in other islands of the Malay Archipelago; new to Borneo.

### FLACOURTIACEAE .

#### CASEARIA Jacquin

CASEARIA ELLIPTIFOLIA sp. nov.

Arbor, foliis firme chartaceis, ellipticis, nitidis, subtus ad costa nervisque leviter pubescentibus, usque ad 11 cm longis, integris, basi acutis vel subacutis, apice late obtuse acuminatis, nervis utrinque circiter 8, prominentibus; floribus axillaribus, fascicu-

latis, breviter pedicellatis, 5-meris, sepalis late ovatis, punctatis; staminibus fertilibus 10, brevibus, staminoideis triangulari-ovatis, acutis, apice ciliatis; fructibus ovoideis vel subellipsoideis, circiter 1 cm longis, glabris.

A tree, the branchlets, petioles, and midrib and lateral nerves on the lower surface of the leaves more or less pubescent with short, subcinereous, appressed hairs, the older branchlets slender, terete, olivaceous, nearly glabrous. Leaves firmly chartaceous, elliptic, entire, 7 to 11 cm long, 3.5 to 5.5 cm wide, equilateral or nearly so, base acute or subacute, apex abruptly and obtusely short acuminate, the acumen often obscurely apiculate, shining, rather pale-olivaceous when dry; lateral nerves about 8 on each side of the midrib, prominent, slender, curved, scarcely anastomosing, the ultimate reticulations slender, close, subparallel; petioles 8 to 10 mm long, somewhat pubescent. Flowers in few-flowered, axillary fascicles, but one or two developing at one time, their pedicels sparingly pubescent, about 1.5 mm long, the subtending bracteoles broadly ovate, somewhat pubescent, 1 to 1.5 mm long. Calyx in fruit about 4.5 mm in diameter, the lobes somewhat pubescent, broadly ovate, usually obtuse, 1.5 to 2 mm long. Fertile stamens 10, about 1 mm long; staminodes triangular-ovate, acute, about 1 mm long, apex ciliate, the tube somewhat united with the calyx below. Fruit ovoid or somewhat ellipsoid, glabrous, somewhat rugose when dry, up to 1 cm in length; seeds 6, about 5 mm long, the aril not lacerate.

SARAWAK, Baram District, Miri River, *Hose 528*, January, 1895.

A species well characterized by its elliptic, entire leaves and its triangular-ovate, acute staminodes.

**CASEARIA HOSEI** sp. nov.

Arbor (vel frutex) ramulis subtus foliis ad costa nervisque floribusque plus minusve cinereo-puberulis, ramis teretibus, ramulis plus minusve angulatis; foliis integris, oblongis, acuminatis, firme chartaceis, nitidis, in siccitate brunneis, usque ad 17 cm longis, basi leviter inaequilateralibus, rotundatis ad subacutis, nervis utrinque circiter 9; floribus fasciculatis, breviter pedicellatis, 5-meris, staminibus 10.

A tree or shrub, the branchlets, lower surface of the leaves on the midrib and lateral nerves, and the flowers rather minutely cinereous-puberulent. Branches terete, glabrous or nearly so, very dark-brownish-red when dry, the branchlets nearly black. Leaves oblong, entire, firmly chartaceous, brown and shining when dry, 11 to 17 cm long, 3 to 6 cm wide, the upper surface quite glabrous, the lower puberulent on the midrib and lateral

nerves, apex distinctly acuminate, acumen usually blunt or slightly apiculate, base somewhat inequilateral, subacute to rounded; lateral nerves about 9 on each side of the midrib, prominent, curved and obscurely anastomosing, the reticulations fine; petioles puberulent, about 8 mm long. Flowers in axillary fascicles, the subtending bracteoles broadly ovate, acuminate, 1 mm long, slightly pubescent. Pedicels 1 to 1.5 mm long, cinereous-puberulent. Sepals 5, oblong, obtuse, about 2.5 mm long, externally sparingly cinereous-pubescent with short hairs. Stamens 10, the filaments alternately long and short, up to 1.5 mm in length, the alternating staminodes oblong-linear, densely villous at the apex, otherwise sparingly pubescent, about 1 mm long. Ovary narrowly ovoid, glabrous, the style slightly ciliate, the ovary and style about 2 mm long; stigma capitate.

SARAWAK, Baram District, Long Lama, *Hose 483* (type), October, 1894; Mount Murud, *Native collector 2932* (Bur. Sci.), December 6, 1914.

A species characterized by its oblong, entire, slightly inequilateral, acuminate leaves, which are puberulent on the midrib and lateral nerves beneath; its dark-colored, cinereous-puberulent branchlets; and 5-merous, puberulent flowers. Its innovations, including the very young leaves, are rather densely subferruginous pubescent.

**CASEARIA MINUTIDENS** sp. nov.

Arbor, ramulis subtus foliis ad costa nervisque floribusque prominente pubescentibus; foliis oblongis, firme chartaceis usque ad 10 cm longis, in siccitate brunneis, acuminatis, pellucidopunctatis, basi leviter inaequilateralibus, late rotundatis vel subtruncatis, margine minute glanduloso-denticulatis, nervis utrinque 7 ad 9, prominentibus; floribus fasciculatis, pedicellatis, 5-meris; staminibus fertilibus 10, staminoides 0.3 mm longis, oblongis, truncatis, villosis; ovario dense villosa.

A tree, the younger parts, lower surface of the leaves on the midrib and lateral nerves rather prominently pubescent with short, spreading, yellowish-cinereous or cinereous hairs, the indumentum on the innovations somewhat ferruginous. Branches and branchlets slender, dark-colored when dry, the latter somewhat angular. Leaves pellucid-punctate, brownish when dry, firmly chartaceous, in general oblong to ovate-oblong, 6 to 10 cm long, 3 to 4.5 cm wide, dull or slightly shining when dry, base broad, abruptly rounded to subtruncate, slightly inequilateral, apex rather abruptly acuminate, the acumen 1 cm long or less, usually acute, margins with numerous, very minute, glandlike teeth, not at all crenulate, the upper surface glabrous or somewhat pubescent along the midrib; lateral nerves 7 to 9 on each side of the midrib, prominent, somewhat ascending, these with

the midrib and, to a less degree, the reticulations prominently pubescent; petioles pubescent, about 3 mm long. Flowers 5-merous, in axillary fascicles, their pubescent pedicels about 2 mm long. Sepals 5, elliptic, rounded, pubescent, 2 to 2.5 mm long. Fertile stamens 10, glabrous, the alternating staminodes forming a very short tube, narrowly oblong, truncate, villous at the tip, 0.3 mm long. Ovary narrowly ovoid, densely villous, including the cylindric-capititate stigma about 1.7 mm long.

SARAWAK, Baram District, Entoyut River, *Hose 407*, August 11, 1894.

Manifestly in the group with *Casearia greviaefolia* Vent., but with fewer lateral nerves. Above all easily distinguished by its numerous, minute, glandlike teeth.

**CASEARIA PUBESCENS** sp. nov.

Arbor, ramulis subtus foliis ad costa nervisque floribusque prominente pubescentibus; foliis oblongis, integris, usque ad 20 cm longis, chartaceis, abrupte acuminatis, basi aequilateralibus, rotundatis, breviter petiolatis, nervis utrinque 12, prominentibus; floribus axillaribus, fasciculatis, breviter pedicellatis, 5-meris, staminibus fertilibus 10; ovario pubescente.

A tree, the branchlets, flowers, and the lower surface of the leaves, especially on the midrib and lateral nerves, prominently pubescent with short, spreading, pale-brownish or somewhat tawny, rather soft hairs. Leaves oblong, chartaceous, brownish-olivaceous when dry, dull or slightly shining, 11 to 20 cm long, 5.5 to 8.5 cm wide, the apex rather abruptly acuminate, the acumens 1 to 1.5 cm long, rather blunt, base equilateral, rounded, margins entire, the upper surface glabrous, or somewhat pubescent along the midrib; lateral nerves 12 on each side of the midrib, prominent, curved-ascending, scarcely anastomosing, the reticulations fine; petioles pubescent, stout, about 5 mm long. Fascicles axillary, the bracteoles very numerous, ovate, acute or acuminate, pubescent, about 1 mm long, forming a dense subglobose mass up to 5 mm in diameter, but few flowers developing at one time. Pedicels pubescent, about 1 mm long. Buds subglobose. Sepals 5, elliptic, concave, rounded, densely pubescent, in bud about 2 mm long. Fertile stamens 10. Ovary ovoid, rather densely pubescent with cinereous or pale hairs, the style very short.

SARAWAK, Baram District, Entoyut River, *Hose 454*, November, 1894.

Apparently as closely allied to *Casearia philippinensis* Merr. as any other species; readily distinguished, however, by its leaves not being gradually narrowed upward but abruptly acuminate, rounded, not acute at the base, and its densely pubescent ovary. From *C. lobbiana* Turcz. it is distinguished by its more numerous lateral nerves and pubescent flowers.

**CASEARIA LEUCOLEPIS** Turcz. in Bull. Soc. Nat. Mosc. 31 (1858) 463.

SARAWAK, Baram District, Baram, *Hose* 79, December, 1894.

This species was originally described from Singapore, based on *Lobb* 468 so localized. In some herbaria, however, *Lobb's* plant is localized as "Luzon." *Lobb* collected in Singapore, Java, Borneo, and Luzon, and it is a well-known fact that his specimens were often erroneously localized; see Merrill in Philip. Journ. Sci. 10 (1915) Bot. 184. *King*<sup>1</sup> does not recognize the species as occurring in the Malay Peninsula, and *Stapf*<sup>2</sup> gives its range as from Java and Borneo to the Philippines. *Koorders*<sup>3</sup>, however, does not admit it as Javan. It is probable that *Lobb's* specimen was from Borneo, not from Luzon, Java, or Singapore. I have seen no Philippine material that I can refer to *Casearia leucolepis* Turcz. *Hose's* specimen cited above agrees very closely with the fragment of *Lobb's* plant that I have for comparison, and I believe that they represent the same species.

**CASEARIA IMPRESSINERVIA** sp. nov.

Arbor, ramulis, subtus foliis ad costa nervisque floribusque griseo- vel cinereo-puberulis vel pubescentibus; foliis oblongis, coriaceis, integris, acute acuminatis, basi acutis, usque ad 8 cm longis, nervis utrinque circiter 8, curvato-ascendentibus, prominentibus, supra impressis; floribus 5-meris, axillaribus fasciculatis, breviter pedicellatis, sepalis 3.5 mm longis, obtusis; staminibus fertilibus 10, staminoideis anguste oblongis, sursum dense villosis; ovario glabro vel supra leviter ciliato.

A tree, size not indicated, the branches and branchlets nearly black when dry, the former glabrous, the latter somewhat pubescent or puberulent, somewhat angled, the internodes about 1 cm long. Leaves coriaceous, oblong, entire, 6 to 8 cm long, 2 to 3 cm wide, sharply acuminate, base acute, equilateral or nearly so, the upper surface quite glabrous, dark-brown and shining when dry, the lower somewhat paler, pubescent with short, rather pale, spreading hairs along the midrib and lateral nerves; lateral nerves 8 on each side of the midrib, curved-ascending, prominent, distinctly impressed on the upper surface, obscurely anastomosing, the reticulations very slender; petioles 7 to 10 mm long, somewhat pubescent. Flowers rather numerous, in axillary fascicles, their pedicels slightly pubescent, about 2 mm long. Sepals 5, oblong, obtuse, somewhat pubescent, about 3.5 mm long. Stamens 10, the longer about 2 mm in length, the alternating five slightly shorter; staminodes narrowly oblong, densely villous above, nearly glabrous below, about 1.2 mm long. Ovary narrowly ovoid, glabrous, or the upper part and lower

<sup>1</sup> Journ. As. Soc. Beng. 67<sup>1</sup> (1898) 14-18.

<sup>2</sup> Trans. Linn. Soc. Bot. 4<sup>3</sup> (1894) 164.

<sup>3</sup> Exkurs. Fl. Java. 2 (1912) 635.



portion of the style sparingly ciliate, including the short style about 2.5 mm long.

SARAWAK, *Native collector 1731* (Bur. Sci.).

Similar to *Casearia hosei* Merr., but with much smaller, sharply acuminate leaves with fewer nerves, which are impressed on the upper surface. In the Bornean species *Casearia laurina* Bl., and *C. capitellata* Bl. the leaves are obtusely acuminate, and they differ in various other characters.

#### FLACOURTIA L. Héritier

FLACOURTIA RUKAM Zoll. & Mor. Syst. Verzeich. (1854) 33.

SARAWAK, Retuh, Sadong, *Native collector 2527* (Bur. Sci.).

This species, not previously definitely credited to Borneo, extends from Burma and the Malay Peninsula to the Philippines, through the Malay Archipelago to Samoa (*Vaupel 219*). The Bornean specimen has the midrib rather densely pubescent, and some of the leaves present as many as nine pairs of lateral nerves, but it is manifestly referable to this species.

#### HOMALIUM Jacquin

HOMALIUM MOULTONII sp. nov. § *Myriantheia*, *Eumyriantheia*.

Arbor inflorescentiis exceptis glabra; foliis oblongo-ovatis ad oblongo-ellipticis, coriaceis, nitidis, integris, vel obscure denticulatis, acuminatis, basi subrotundatis ad acutis, usque ad 10 cm longis, nervis utrinque circiter 8; inflorescentiis racemosis, racemis elongatis, puberulis; floribus 10-meris, circiter 5 mm diametro sepalis petalisque linearibus; staminibus 20, glandulis magnis, dense tomentosis.

A tree, glabrous except the inflorescence. Branches and branchlets, rather slender, terete, reddish-brown, glabrous. Leaves olivaceous when dry, shining, coriaceous, oblong-ovate to oblong-elliptic, 7 to 10 cm long, 3 to 5.5 cm wide, entire or obscurely and distantly denticulate, apex distinctly acuminate, acumens blunt, base acute to somewhat rounded; lateral nerves about 8 on each side of the midrib, slender, distinct, curved, anastomosing, the reticulations distinct; petioles about 5 mm long, pruinose. Racemes axillary, solitary, slender, cinereous-puberulent, up to 18 cm in length. Flowers 10-merous, the narrowly funnel-shaped tube cinereous-pubescent, merging with the short pedicel; the flower, including the tube and pedicel, about 5 mm long, 5 mm in diameter. Sepals 10, linear, pubescent, in anthesis about 2 mm long. Petals similar to the sepals, slightly wider below, some of them eventually nearly 3 mm in length. Stamens 20, their filaments about 1 mm long, intermingled with the large, densely tomentose glands, which completely fill the throat of the perianth; styles 3 or 4, short, glabrous.

SARAWAK, near the foot of Mount Santubong, *Native collector 2376* (Bur. Sci.), February-June, 1914.

A very characteristic species, the third of the genus to be reported from Borneo; well characterized by its elongated, axillary, puberulent or pubescent racemes; its 10-merous, rather small flowers; its linear sepals and petals; and its large, densely tomentose glands, that completely fill the throat of the perianth-tube. Dedicated to Mr. J. C. Moulton, director of the Sarawak Museum.

**HOMALIUM HOSEI** sp. nov. § *Myriantheia*, *Eumyriantheia*.

Arbor, inflorescentibus parce pubescentibus exceptis glabra; foliis coriaceis, integris vel leviter crenulatis, ovatis ad oblongo-ovatis, nitidis, usque ad 16 cm longis, obtuse acuminatis, basi rotundatis ad subacutis, in siccitate supra subolivaceis, subtus castaneis vel brunneis, nervis utrinque circiter 7; racemis axillaribus, solitariis, ad 9 cm longis; floribus 5-meris, cum pedicellis circiter 8 mm longis, calycis anguste infundibuliformibus, sepalis 5, coriaceis, anguste ovatis, obtusis, petalis dense pallide pubescentibus, oblongo-ovatis, obtusis; staminibus 15, filamentis glabris, 2 ad 2.5 mm longis.

A tree, glabrous except the inflorescence. Branches and branchlets grayish or brownish. Leaves thickly coriaceous, ovate to oblong-ovate, 7 to 16 cm long, 4 to 7 cm wide, entire or somewhat crenulate or crenate, apex distinctly acuminate, the acumen blunt, base rounded to subacute, when dry shining, the upper surface subolivaceous, the lower castaneous or brown; lateral nerves about 7 on each side of the midrib, prominent, curved, anastomosing, the reticulations distinct; petioles 2 to 3 mm long. Racemes axillary, solitary, sparingly pubescent, 7 to 8 cm long. Flowers mostly in groups of twos or threes, spreading or reflexed, including the short pedicels about 8 mm long, the pedicels and calyx very slightly pubescent. Calyx-tube brown when dry, slightly sulcate, narrowly funnel-shaped. Sepals 5, coriaceous, brown when dry, nearly glabrous, oblong-ovate, narrowed upward, obtuse, 2.3 to 3 mm long. Petals about as long as the sepals, densely pale-pubescent, oblong-ovate, obtuse. Stamens in groups of threes opposite each petal, their filaments glabrous, 2 to 2.5 mm long. Styles 4, appressed-hirsute, 2.5 to 3 mm long.

SARAWAK, Baram District, Baram, *Hose 409* (type), December, 1894.

Here I also refer *Hose 128, 270*, from the same locality, and *Native collector 1377, 1943* (Bur. Sci.), these four specimens presenting only very immature flowers. The species is readily distinguished by its floral characters.

**OSMELIA** Thwaites

**OSMELIA BORNEENSIS** sp. nov.

Arbor dioica partibus junioribus inflorescentisque exceptis glabra; foliis oblongis, usque ad 17 cm longis, in siccitate brun-

neis, chartaceis, integris vel obscure crenulatis, prominente acuminatis, basi acutis, nervis utrinque 5 ad 8, prominentibus; inflorescentiis racemosis, ♂ et ♀ quam foliis multo longioribus; floribus numerosis, 4-meris, sepalis glabris; fructibus circiter 1 cm longis, dense tomentosis.

A dioecious tree, glabrous except the young branchlets, very young leaves, and inflorescences. Branches slender, terete, usually pale-gray, the young branchlets minutely appressed cinereous-puberulent. Leaves oblong, entire or very obscurely crenulate, brown and slightly shining when dry, 8 to 17 cm long, 3 to 6.5 cm wide, base acute, apex rather slenderly and prominently acuminate, the acumen 1 to 1.5 cm long, usually apiculate, both surfaces quite glabrous or the midrib and lateral nerves beneath minutely and obscurely puberulent; lateral nerves 5 to 8 on each side of the midrib, prominent, curved, anastomosing, the reticulations very slender; petioles usually about 1 cm long; stipules linear-acicular, 3 to 4 mm long. Staminate and pistillate racemes in the uppermost axil, sometimes in lower axils, usually simple, rarely with a single elongated branch from the lower part, up to 30 cm in length, both much exceeding the leaves in anthesis, appressed-pubescent with pale hairs. Flowers numerous, few in the axil of each bract, the pedicels about 1 mm long, pubescent, the acuminate bracts about as long as the pedicels. Flowers all 4-merous. Sepals broadly ovate to elliptic ovate, membranaceous, glabrous, rounded, of the staminate flowers 2.5 to 3 mm long, of the pistillate ones about 2 mm long. Scales densely pale-pubescent, about 1.5 mm long. Rudimentary ovary of the staminate flowers oblong, densely pubescent, shortly stipitate, about 2 mm long; filaments slightly pubescent below, about 3 mm long, those of the pistillate flowers about 1 mm in length. Ovary globose, densely pubescent, tipped by three short glabrous styles. Fruit about 1 cm long, oblong, usually somewhat inequilateral, with three rounded angles, densely pale-tomentose. Seeds ellipsoid, about 5 mm long.

SARAWAK, Baram District, Marudi, *Hose 323* (type); Lembang, *Hose 747*; various localities in the vicinity of Kuching, *Native collector 642, 643, 1143, 1144, 1145, 1152, 1168, 1826, 1908* (Bur. Sci.).

This small genus has previously not been reported from Borneo, the known species being *Osmelia paniculata* Warb. (*O. gardneri* Thw.) of Ceylon, *O. maingayi* King of the Malay Peninsula, *O. celebica* Koord. of Celebes and Mindanao, and three Philippine species, *O. conferta* Benth., *O. philippinensis* Benth., and *O. subrotundifolia* Elm. The species above described appears to be most closely allied to *Osmelia maingayi* King, from which it differs in its usually simple, elongated racemes, its glabrous leaves, and its entirely glabrous sepals.

## RYPAROSA Blume

## RYPAROSA ACUMINATA sp. nov.

Arbor, ramulis adpresse hirsutis, inflorescentiis ♂ elongatis, dense adpresse ferrugineo-hirsutis; foliis oblongis, subcoriaceis, tenuiter acute acuminatis, usque ad 22 cm longis, basi acutis, subtus pallidis, nervis utrinque 3 vel 4, curvato-adscententibus, prominentibus; racemis ♂ axillaribus, solitariis, usque ad 30 cm longis, floribus numerosis, breviter pedicellatis, sepalis petalisque circiter 3 mm longis.

A tree, the branchlets and the leaves on the midrib and lateral nerves on the lower surface appressed-hirsute, the staminate racemes densely ferruginous appressed-hirsute. Leaves oblong, subcoriaceous, 12 to 22 cm long, 3.5 to 7 cm wide, the upper surface pale-olivaceous, smooth, shining, the lower pale, subglaucous, the base acute, the apex slenderly and acutely acuminate, the acumen 1 to 2 cm in length; lateral nerves 3 or 4 on each side of the midrib, prominent, curved-ascending, the reticulations distinct; petioles 1 to 1.5 cm long. Male racemes axillary, solitary, 15 to 30 cm long, apparently floriferous throughout, but the lower flowers caducous. Pedicels pubescent, about 1.5 mm long. Sepals three, elliptic-ovate to elliptic, 2.5 to 3 mm long, appressed ferruginous-hirsute. Petals 5, membranaceous, oblong-ovate, acute or somewhat acuminate, somewhat pubescent, the basal scale densely ciliate, about 1 mm in diameter. Staminal column glabrous, 2.5 to 3 mm long, slender, somewhat thickened upward; anthers five, 1 mm long, forming a depressed-globose head.

SARAWAK, Baram District, Miri River, *Hose 501*, January, 1905.

The second species of the genus to be reported from Borneo, readily distinguished from the other described forms by its slenderly and sharply acuminate, few-nerved leaves. *Hose 430* possibly represents *Ryparosa longipedunculata* Boerl., a Javan species, but the flowers are quite too young to warrant a definite determination of it.

## VIOLACEAE

## RINOREA Aublet

RINOREA ANGUIFERA (Lour.) O. Ktze. var. *NERVOSA* (Capit.).

*Alsodeia echinocarpa* Korth. var. *nervosa* Capit. in Bull. Soc. Bot. France 57 (1910) 394.

SARAWAK, *Native collector 438, 878, 1370* (Bur. Sci.); Samatan, *Forworthy 168*, May 2, 1908.

The above specimens are apparently referable to Capitaine's variety, which is here transferred to *Rinorea anguifera*. *Medusa anguifera* Lour., Fl. Cochinch. (1790) 406, supplies the oldest specific name for the species.

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